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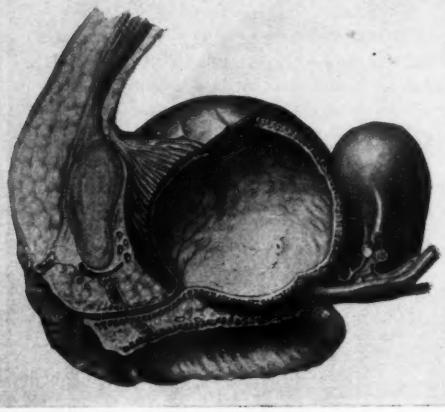

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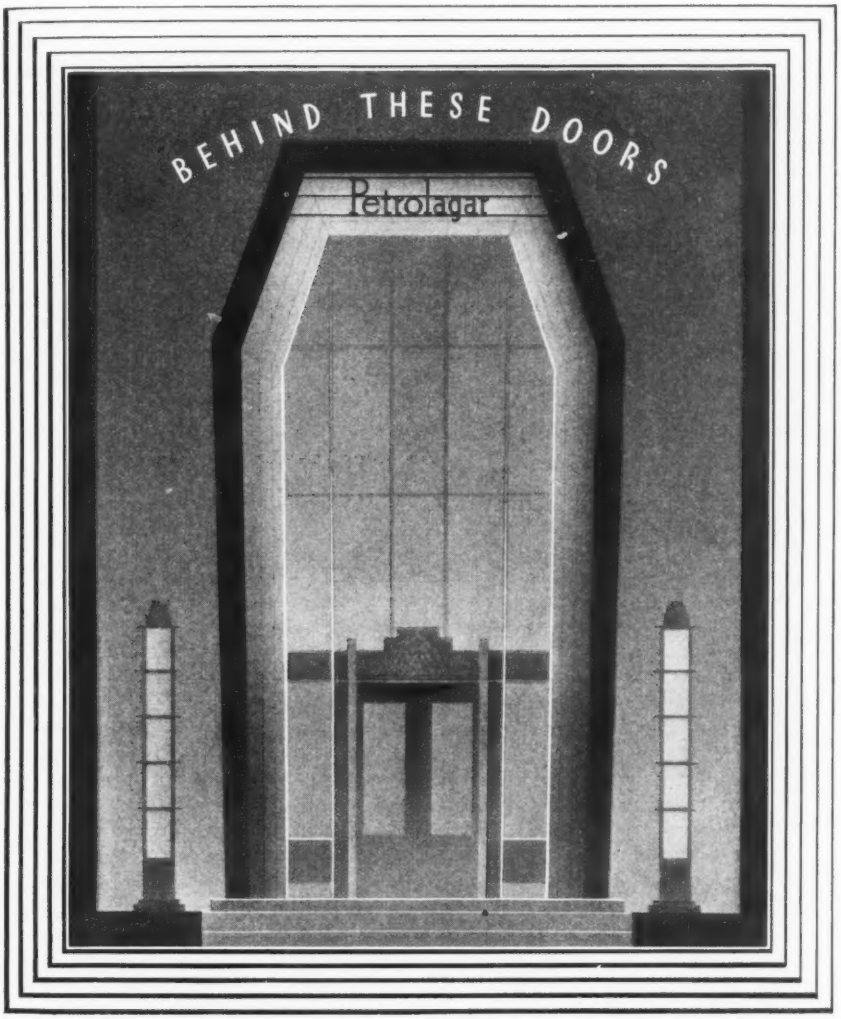

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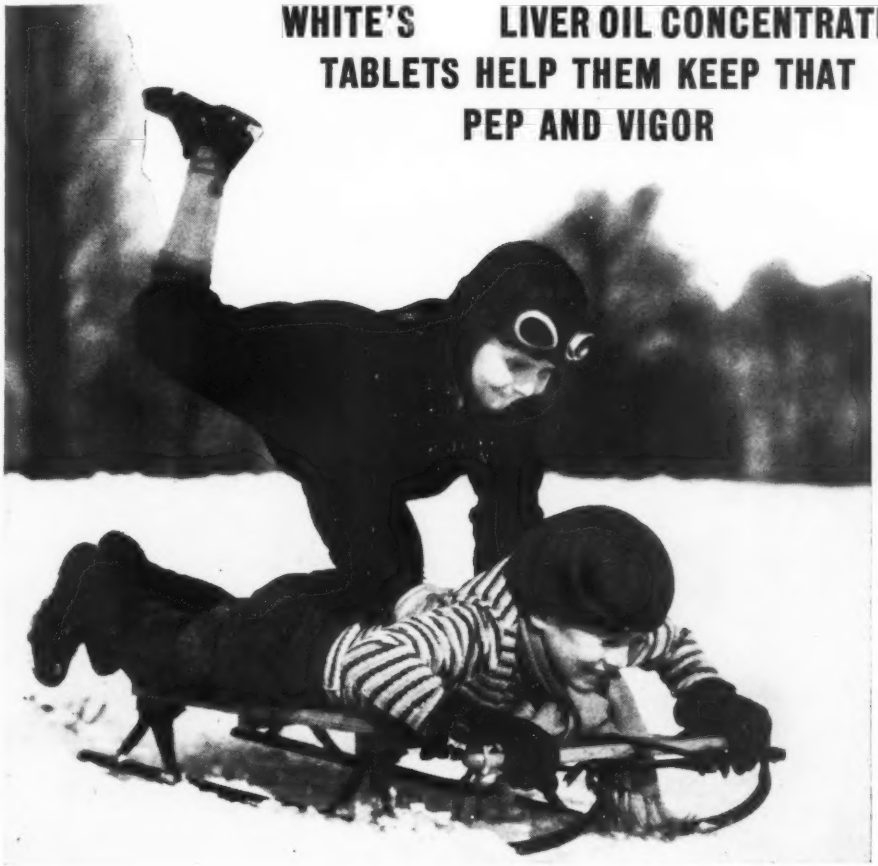

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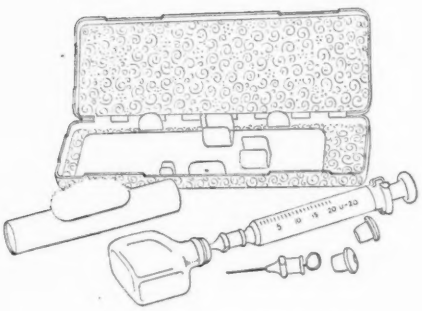

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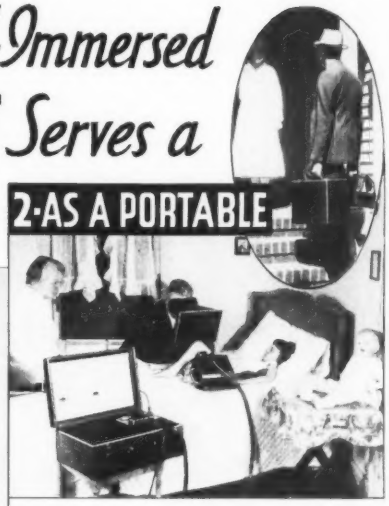

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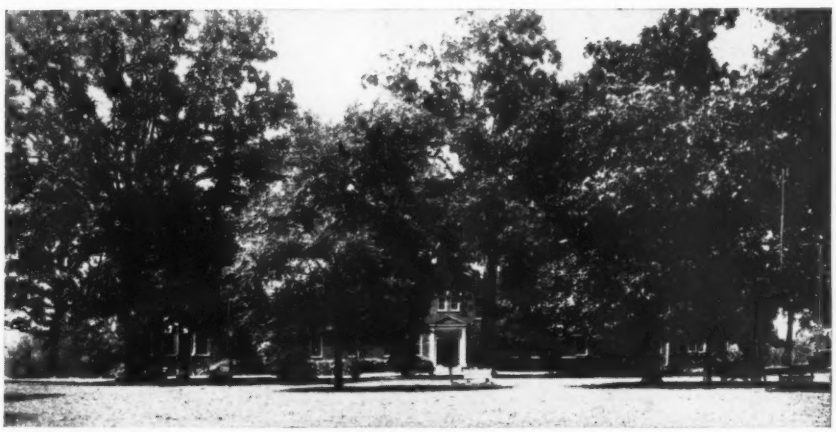

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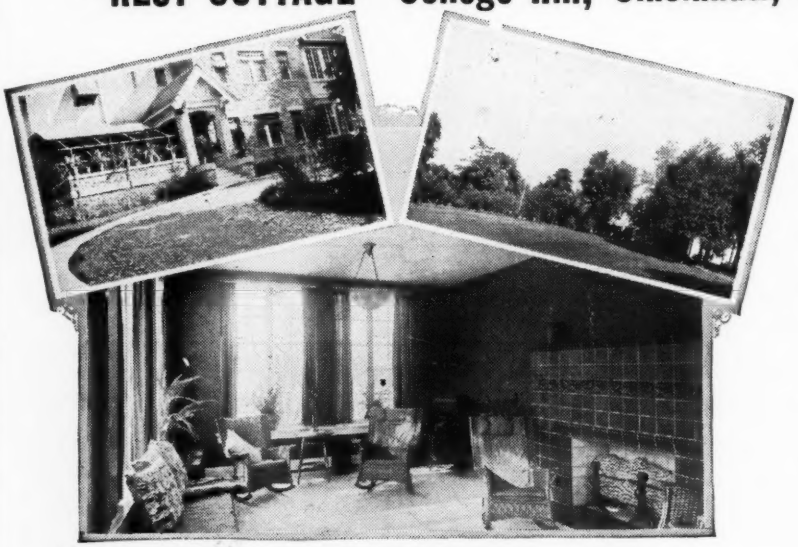

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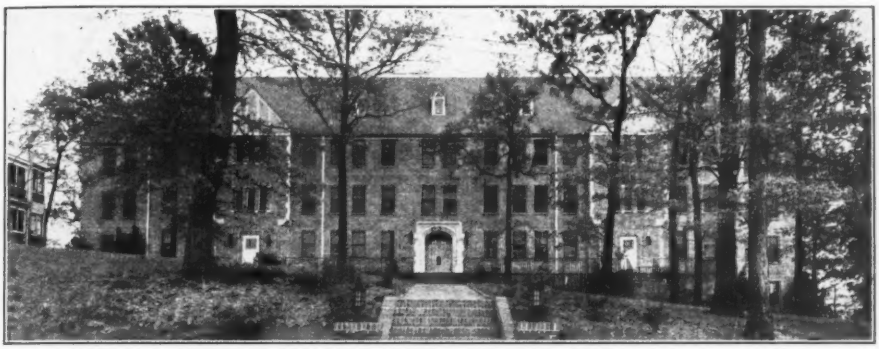

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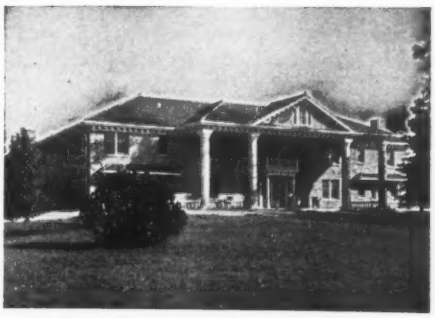

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GASTRIC CARCINOMA: A CLINICAL RESEARCH*

PREOPERATIVE COURSE AND POSTOPERATIVE RESULTS

By ERNEST H. GAITHER, M.D.,
Baltimore, Maryland

INTRODUCTION

I wonder how many of us realize that cancer is now the second leading cause of death in the United States, with an approximate total mortality of 125,000? This realization must come as a shock to anyone not actively engaged in intensive study of this malevolent disease, for it is a matter of general knowledge that millions of dollars are being expended annually in the fight for cancer control; and a cursory glance at the enormous number of contributions on the subject, furnished by men of brilliant gifts and persistent industry in research, would seem to indicate the supererogation of any further study such as that I now wish to present. However, close study of the literature reveals the lamentable fact that little worth while progress as to early diagnosis has as yet been accomplished, that in the vast majority of cases therapy other than surgery has failed, and that surgery itself has usually been advised too late to save the patient. Hence, my endeavor to place before you a careful and intimate study of this insidious disease as it involves the stomach. It is my hope that by comparison of preoperative course and postoperative results in a stated number of cases drawn from both sexes of the white and colored races, we may see our way somewhat more clearly toward our goal of swifter diagnostic progress and better therapeutic methods. Certainly no labor can be lost that throws the least gleam of light upon this yet unsolved, but not insoluble, problem.

The 245 cases analyzed are all operatively demonstrated gastric carcinomas, treated in the Johns Hopkins Hospital during the past ten years, the greater number having been operated upon by Dr. Dean Lewis. While the case histories were occasionally incomplete in regard to various items, the statistics presented have for the most part been based upon an exact estimate of all findings given. I also append a summary of 25 of these cases studied postoperatively, the examinations having been made under my personal supervision, and the percentages similarly computed.

It is highly important to note at the outset that close perusal of these case histories reveals the average physician as holding an entirely erroneous idea of the clinical course in gastric cancer; I am convinced that this is due to inadequate exposition in text-books, and that because of it many early diagnoses are missed and lives consequently lost. At the present moment we know just enough to be certain that early diagnosis is our only hope.

The clinical history evolved from this large group of operatively demonstrated gastric cancer cases is so entirely different from the stereotyped, timeworn presentation of the text-books, that it indicates an imperative need for a new conception of the symptomatology and a new interpretation of the clinical findings.

This research should abolish one fallacy which has obtained firm root; that is, that the presence of organic structural disease will cause continued and permanent symptoms. This persistent error alone has led to many incorrect diagnoses.

It has been proven beyond peradventure of doubt that organic malignant disease, even in an advanced stage, may result in remittent or intermittent symptoms; and since it is a tragic but indisputable fact that the process often advances to an inoperable stage before the victim

*Chairman's Address, Section on Gastroenterology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

*From the Digestive Clinic of Johns Hopkins Hospital, Baltimore, Maryland.

has any warning of its presence, it is well to bear in mind the following important points:

(a) Local gastric symptoms, loss of appetite, cardialgia, eructation, pyrosis, nausea, vomiting, pain, distention, and variable types of discomfort are no worse in beginning carcinoma than in other gastric diseases.

(b) A latent stage is possible, during which time the process advances very slowly, with an utter absence of symptoms.

(c) A general marasmus, or a variable anemia, may occur, with the gastric symptoms so wholly in abeyance as to be quite unrecognizable.

(d) A beginning carcinoma may progress without definite symptoms; again, it is marked by ulcer symptoms, or symptoms of chronic gastric catarrh.

It must, alas, be acknowledged that there are as yet no universally applicable pathognomonic early symptoms or signs of gastric carcinoma; and it must always be remembered that as the growth extends to, and involves, the surrounding structures, all symptoms become increasingly complicated and deceptive.

This regrettable state of affairs should be the best of arguments for periodic examinations, for have not all these facts, and all our experience proven that we must go to the cancer, since in most instances it does not come to us?

HISTORY AND SYMPTOMS

Let us now turn to the clinical histories and outstanding symptoms of these 245 operatively-demonstrated cases of gastric cancer.

Time between onset of symptoms and consultation often leads the physician astray. The history may be that of a very recent digestive upset; a number of cases reported illnesses of from one to four weeks only; yet upon examination a large mass was discovered, and when laparotomy was performed inoperable carcinoma was present. Because such tragic occurrences are not rare we instruct our students that in every case presenting a digestive complaint the attitude assumed must be that recommended in the acute abdomen; that is, the case is not to be allowed to pass from continued study and observation until one is thoroughly convinced of the diagnosis.

The period of duration of subjective symptoms varies greatly; indeed, it may extend into years, and in such cases two pathologic processes may play a role; either the cancer may result from malignant degeneration of a benign ulcer, or a slow-growing carcinoma may require months or years to develop, and in its later stage may undergo ulceration.

Here I may state that whether the percentage of benign ulcers ultimately showing malignant degeneration is five or twenty-five, is of slight consequence, and the acrimonious debate upon this point is rather a waste of valuable time. It should be sufficient to recognize the possibility of such degeneration and to bear it constantly in mind.

Pain.—The widespread opinion has been that pain is constant, of the rather dull, aching type. Nothing could be further from the proven facts; and after studying closely many groups beside the one here presented, I can assert that this basic error is a pitfall for the unwary. Actually, the pain is of every possible kind, sharp, shooting, boring, burning, twisting, cramplike, aching, pressing. One could quote almost *ad infinitum* from descriptions given by the patients themselves; and because there is really no characteristic cancer pain, I feel that a consideration of the character of pain is of negligible importance. I have therefore contented myself with ascertaining if true pain of any kind, as opposed to mere epigastric discomfort, has been present. Paradoxical as it may seem, instances are on record in which the disease progressed to an advanced stage without pain; indeed, I have observed a few cases in which throughout the entire illness the patient insisted on the utter absence of pain. Some patients have complained of a peculiar, indescribable but distinct discomfort; sometimes fullness and distress are described; the ignorant may present "a misery" as the outstanding complaint. Of particular interest were several cases which showed large non-sensitive growths, and after a palliative operation were still without pain or soreness.

Pain in the early stages of carcinoma may be considered in the light of an unmixed blessing, if by forcing the patient to seek medical advice it places him in the hands of a physician who is alert to all the implications of the situation.

Pain in the back should always render one suspicious of metastatic extension to surrounding tissues and organs, notably the pancreas, spine, and retroperitoneal glands and structures. One case presented pain in the posterior lumbar region as the first and continued symptom, and

laparatomy revealed a gastric carcinoma with retroperitoneal metastasis.

In 71 per cent the upper abdomen, chiefly the epigastric area, was the seat of pain. But at this point a note of warning must be sounded: location is not a dependable indication. Discomfort in various portions of the lower abdomen has often been complained of by cancer patients, when the site of growth proved to be a painless upper abdomen.

As to intermittency or constancy of pain, here again the course may be deceptive. In the majority pain was markedly intermittent in early stages, becoming constant in the terminal months, weeks, or days. Occasionally intermittency continued to the end. This may be attributed to a continuation of the ulcer syndrome, which in some cases preceded the cancer, although in quite a number operation failed to show the slightest pathologic evidence of preexistent ulcer.

There was frequently noted a typical ulcer syndrome, the pain appearing a short time after meals, or some hours after, relief being obtained from food, drink, or drugs. In this connection it is interesting to note Bueerman's interpretation:

"Ulcer histories occur with primary carcinomatous ulcers and within a five-year period, in certain instances, may be considered as caused by the carcinomatous ulcer without pre-existing benign ulcer."

Appetite.—Anorexia is frequently an outstanding symptom, but a surprising number asserted that there had been no impairment of appetite; sitophobia was only rarely noted. One recently studied postoperative case with severe pain, soreness, local tenderness, anemia (hemoglobin 40 per cent), and a state of emaciation and debility so marked as to approach the absolutely invalid stage, volunteered the statement that her appetite was excellent!

In the early part of the disease appetite is extremely variable; and if the patient gains weight, appetite increases, hemoglobin rises, we may easily be deceived as to the underlying pathology, revise the diagnosis, and allow the patient to drift until a more advanced stage of carcinoma is evident.

Hematemesis.—It must be noted that in gastric carcinoma, hematemesis is quite rare; but let me hasten to add that it does happen, though the vomitus is not likely to be of the same character as the profuse hemorrhage secondary to ulcer, but is more of the coffee-ground type. However, profuse and acute bleeding, particularly from the ulcerating carcinoma, or the carcinomatous ulcer, may, and sometimes does, occur. We can, therefore, by no means conclude that hematemesis forces a diagnosis in favor of benignancy.

Nausea and vomiting form an important subdivision. I must confess I did not suspect their prevalence before studying this group. Certainly a large majority, at some period of their illness, complained of one or both conditions.

Several cases presented the unusual picture of a history most suggestive of carcinoma, yet quite clear as to the entire absence of nausea and vomiting, while upon preoperative lavage amounts of foul, stagnant, fermenting gastric content, ranging from 1000 to 1500 c. c., were obtained. There were also cases, particularly those in which at operation the carcinoma proved to be in a silent area, notably the lesser curvature, where the patient had insisted that not the slightest trace of nausea had ever been noted.

Bowel.—Seventy per cent complained of constipation, a number having developed this condition after the onset of symptoms. Diminution of food-intake and exercise, and growing obstruction would probably rank as the most frequent causative factors.

Diarrhea was noted in several cases; it proved most likely to occur in those with a true achylia of the gastrogenous type.

The macroscopic and microscopic attributes possess no diagnostic value.

Tarry stool was recorded in only 12 per cent; I am convinced that the patient's judgment in this regard is usually faulty, and that we can never be entirely sure that the condition has been present unless the patient was under close observation by a physician, a qualified nurse, or other informed individual. Should such a stool be observed the patient should be questioned as to drugs, food and drink recently taken.

Occult blood is a most valuable finding, and we attach the greatest importance to the results of examinations in this regard, since in the majority of cases of gastric carcinoma occult blood is constantly present. When it is intermittently or entirely absent we begin to doubt the accuracy of our diagnosis. However, let me emphasize that in a few cases there has been an intermittent or entire absence of occult blood in the stool.

Weight has been of marked significance in

this study. The enormous loss of weight in a large majority has amazed and impressed me. Practically every patient shows an appreciable diminution, making this item an important objective sign.

As I shall show in my exposition of the postoperative cases, the weight lost during the original cancerous process may never be regained, even though the patient be apparently cured.

The following disturbing situation sometimes develops: after a positive diagnosis of gastric cancer has been made, the symptoms and findings being of a most contradictory and puzzling nature, the application of rest, diet and medication has brought about a decided increase in weight and sensation of well-being. Now the question arises, shall operation be delayed because of this improvement? Here we must use every iota of judgment derived from experience. If cancer is really present, and operation is postponed, the patient is denied opportunity for relief, and possibly cure, and a valuable life may be lost.

Soreness and Tenderness, Local and General.—Particular attention has been paid to these symptoms, soreness being more subjective, and tenderness assuming an objective nature. This study revealed an almost total absence of complaints of soreness, while localized tenderness was frequently found. It has been asserted that marked tenderness on palpation derives only from growths that cause a breach of the smooth visceral peritoneal covering and threaten to perforate.

Family History of Carcinoma.—Information furnished by the case histories showed that in every instance inquiry had been made by the physician as to familial diseases, and that the answers had shown an almost complete absence of familial carcinoma history. It is true that the ignorance and low social status of some of the patients may well account for at least a part of this remarkable record.

Hemoglobin.—Anemia was present in 63 per cent. Some of the readings are so low it seems incredible that patients can get about and attend actively to their tasks, with such overwhelmingly subnormal blood conditions. Many appear for the first consultation, the disease having been present for months, with a hemoglobin well below fifty, and red cells below three million, yet objectively suffering no particular ill effects.

Because of these findings we lay great stress upon the condition of the blood as an aid in diagnosis, and yet very high hemoglobin readings in a number of advanced cases of gastric cancer are a melancholy warning that anemia cannot be used as a criterion in this baffling malady.

Wassermann.—Eight per cent had a positive Wassermann. However, it was the opinion of the surgeons and syphilologists consulted in these cases that the gastric disease was carcinomatous and lues played no role.

Motor function is of the highest importance, and in its evaluation the x-ray has proven of the utmost dependability. The accumulated statistics presented show that 64 per cent suffered a motor incompetency. Such a condition is, strangely enough, one to be desired, since in the majority of instances it means a greater or less degree of pyloric block, and if the malignant change progresses rapidly the patient is forced at a comparatively early date to seek medical advice.

Unfortunately those growths attacking the silent areas, the lesser curvature, and toward the cardia and fundus, are more likely to progress to the inoperable stage before the patient has warning of impending danger.

In most cases with obstruction, marked or complete relief of pain can be obtained by lavage, though at times such therapy is ineffectual and opiates are necessary. It has been suggested that in these cases pain may be due to infiltration of nerve fibres, though whether these are visceral or somatic is not clear.

It is difficult to explain the phenomenon referred to under "Nausea and Vomiting," of an enormously dilated stomach with almost complete pyloric block and an utter absence of nausea or vomiting. In one such case the hemoglobin was 102 per cent, the red cells 4,552,000, and there were extensive metastases.

Secretory function, from the standpoint of early diagnosis and effective therapy, is not nearly so helpful as motor function. Yet it does possess a degree of value, for we observe an achylia or a decided subacidity in the majority of cases.

Dr. Dean Lewis is strongly committed to the opinion that we should pay particular attention to a secretory finding of achylia in every case presenting even remotely suspicious evidence of gastric cancer; he also considers that this point is not sufficiently emphasized. In the chart you will note the preponderance of achylia,

with hypochlorhydria fairly noticeable, and normal hydrochloric acid in only one per cent. Among the cases of hyperchlorhydria was one astonishing finding of free acid 103, and total acid 112. This case was also studied postoperatively.

The statistics given certainly emphasize the fact that an achylia does not prove the presence of cancer, and hyperacidity is no proof of its absence.

In cases where the various symptoms, signs and findings are decidedly inconclusive, and we are at our wits' end to make a definite diagnosis, aid may be afforded by repeated gastric analyses. A falling acidity is at least suggestive.

Physical Findings.—Study of mass proves most instructive, leading to the unmistakable conclusion that we lay too much stress upon its presence or absence, and may thereby be led astray. For example, in an astonishing number of cases, after the most careful palpatory investigations had failed to offer the slightest evidence of mass, laparatomy revealed a tumor so large that it seemed incredible it could have escaped palpation.

Mouth.—You will note in the chart the large percentage showing oral sepsis. However, I can discover no particular relationship to etiology.

Visible peristalsis was observed in a very small percentage, and while it is a convincing and helpful sign in diagnosis, yet we are well aware that when it occurs other outstanding evidence of disease will already have enabled us to make a diagnosis.

This phenomenon may escape observation, even in complete obstruction, because of extreme atony and weakness of the walls, with consequent shallow waves. On the other hand it is possible, if not probable, that a thickness of the abdominal wall may also preclude discovery of the condition.

Cachexia.—It is difficult to believe that cachexia was detectable in so small a percentage, in spite of the fact that the histories reveal the very special attention paid to color and general appearance of the patient.

Age.—The average estimated age is 55 years, but the range is chiefly from the early forties to the early seventies, with individuals both below and above those ages. The youngest patient was 17, and the oldest 81. Among colored patients the average age was slightly lower than among the whites, or fifty years.

Sex.—Eighty-three per cent were males.

Race.—A large majority were white, though the Clinic offers equal opportunities to both races.

Pathological Report.—Half the cases pathologically examined were of the adenocarcinomatous type. This is an opportune moment to warn against an over optimistic attitude toward microscopically demonstrated carcinomatous infiltration. It too often happens that after months or even years of confident belief in a cure, recurrence of the disease is noted. There are authorities who claim that carcinoma is never really cured, and that the only reason no return is noted is because of the intercurrent death of the patient.

It has been asserted by pathologists that the histological structure of carcinoma does not always settle the prognosis, for very often the most malignant forms of cancer have no recurrence. Furthermore, they aver that one can easily miss a beginning carcinomatous degeneration of an ulcer, since it is impossible to study the entire piece by a series of cuts, and it happens not infrequently that the anatomo-pathologist gives a diagnosis of callous ulcer, the patient dying in less than a year of metastasis to the liver.

The opinion is offered that cancer may form at the area of the gastritis which is always present in ulcer, and that it may never be possible to determine accurately the percentage of gastric ulcers undergoing malignant degeneration.

Personal experience leads me to agree with those authorities who state that it is possible for gastric cancer with the ulcer type of history to exist for three to five years as a primary carcinoma, for I am convinced that in not a few instances cancer may present itself as a slow growing process. It is in the cases presenting only microscopic evidence of malignancy that the most misleading and contradictory findings appear: acidity, motor or sensory disturbances, or absence of dysfunction, and stools positive or negative for occult blood. A careful observation of the hemoglobin may at times prove of value.

I desire to call briefly to your attention a number of cases whose first and most persistent symptoms related wholly to the esophagus. Operation revealed the primary growth in the cardiac area of the stomach, the patient ultimately

succumbing to esophageal obstruction. This course of events is but another evidence of the contradictions of this devastating malady.

Metastasis was found at operation in 67 per cent of cases.

Immediate Result.—While only 25 per cent of the discharge notes stated that the patient left the hospital unimproved, it seems but fair to say that aside from those who were so fortunate as to obtain a favorable outcome through radical operation, the subsequent course was progressively downward.

One readily realizes that the result is in every case influenced by the previous duration of the illness and the general condition of the patient, as well as by the extent of stomach involvement and metastasis.

X-ray.—Time prevents other than a cursory allusion to x-ray, which has effectively proven its inestimable value. However, we must not be so unfair to the roentgenologist as to expect this procedure to be 100 per cent perfect; for among other contradictory findings there is the complete pyloric block in which no irregularity as regards the stomach can be demonstrated. If the radiologist and the diagnostician are not alert to all possibilities, a mistake in the differentiation between benign and malignant disease may easily be made, and such an error, leading to delay in operative procedure, is of course most detrimental to the patient.

POSTOPERATIVE RESULTS OF TWENTY-FIVE CASES

It was no easy task to gather my group of twenty-five postoperative gastric cancer cases; indeed, it required months of effort. I am familiar with the very optimistic reports and results published recently by other observers; also with the fact that some cases such as those under discussion here do regain perfect health, while others are so fortunate as to have their lives prolonged by palliative measures. But I must regretfully assert that I am unable to report the large proportion of cures and the increased longevity shown by the researches of others.

Of the 245 cases studied, 130 had already been reported dead, 115 letters were sent to the supposed survivors, and only 44 replies were received; 29 of these were from relatives reporting the death of the patient; 15 were from survivors themselves.

I was particularly impressed by the almost incredible improvement and undoubted prolongation of life in some cases, more particularly those which had shown not only obstruction, but also metastasis. Since many sufferers from gastric cancer obtain relief by palliative measures such as gastroenterostomy, when resection is impossible, I always advise surgical interference unless all signs and symptoms contraindicate such a course. However, it is understood that experience and clinical sense must be the guides in this regard. In this series it had been possible to perform resection in 52 per cent only. This in itself is an obvious handicap.

Only three cases reported a recurrence of pain. This is a much needed note of encouragement. A surprising majority reported normal bowel evacuation, and only two cases showed tarry stool. The appetite was good, for the most part, while nausea and vomiting were remarkably lessened, with hematemesis recorded on one occasion only. However, the percentage of anemia had dropped only three points. Soreness had

Table 1

PREOPERATIVE COURSE OF 245 CASES

	Per Cent
(1) Time between onset and consultation:	
Average 3½ months	71
Average 2½ years	24
(2) Pain	58
Location of pain, epigastrium	71
Pain intermittency at first, later constant	67
(3) Appetite, anorexia	55
(4) Hematemesis	7
Nausea	67
Vomiting	65
(5) Bowel, constipation	70
Tarry stool	12
Occult blood	76
(6) Weight, average loss 29 lbs.	
(7) Soreness, local	4
Local and general	3
Tenderness, local	41
Local and general	3
(8) Family history for carcinoma	3
(9) Anemia	63
Wassermann positive	8
(10) Motor function, obstruction	64
(11) Secretory function, achylia	64
Hypochlorhydria	14
Hyperchlorhydria	4
(12) Physical findings: Mass	40
Mouth, sepsis	56
Visible peristalsis	9
Cachexia	17
(13) Race, white	81
Sex, male	83
Average age, 55 years.	
(14) Operation: Resection	28
Gastroenterostomy	38
Immediate result, improved	44
Unimproved	25
Postoperative mortality	18.8
(15) Metastasis	67
Pathological report, adenocarcinoma	50
Other types	50
(16) Average life of survivors:	
3 1/3 months	50
1 2/3 years	16
Over five years, 2 cases, or	0.82

Table 2

POSTOPERATIVE RESULTS OF 25 CASES

	Per Cent
(1) Time between operation and re-examination:	
1 to 9 years	70
3 to 10 months	30
(2) Operation: Resection	52
Gastroenterostomy	40
Jejunostomy	8
(3) Metastasis	44
Pathological report given in 12 cases:	
Adenocarcinoma 4	
Other types 8	
(4) Bowel, regular	90
Occult blood	80
(5) Appetite, good	80
Nausea	16
Vomiting	12
(6) Weight, no gain	52
(7) Anemia	60
(8) Motor function, normal	87.5
(9) Secretory function, achylia	76
Hypochlorhydria	19
(10) Physical findings: Mass	36
Mouth, sepsis	44
Cachexia	12

practically disappeared, and tenderness was but rarely noted. That motor power had become normal in an overwhelming majority is a vitally important item, and to my mind has been the greatest factor in restoring a sense of well-being. The failure to gain weight, in those exhibiting signs of marked improvement in other respects, must be considered significant.

In closing this brief resumé of the postoperative findings in my small available group of survivors, I must call to your attention the discouragingly large percentage of cases showing metastasis. In this connection it is well to recall, however, that many such cases sought medical advice within a few weeks or months after the initial onset of symptoms.

SUMMARY

This study proves the atypical manifestations of gastric carcinoma in the history, physical results of laboratory findings, and investigations, and thus emphasizes the necessity for a reappraisal of the clinical history of the disease.

First and foremost, we must abolish the notion that the symptoms are usually gradual. They are not gradual. Our experience teaches that on the contrary they may be extremely abrupt in appearance, though the subsequent course may be either gradual or rapid. In connection with this point, we must remember that one of the most tragic features of the disease is the insidious, symptomless, markedly progressive growth which often overwhelms the patient before he has been led to suspect any untoward development. An interesting and instructive case should be reported at this juncture: a white man, with ulcus history of ulcer, acute perforation, worked up to the very moment of catastrophe. Operation revealed an infiltrating carcinoma with widespread metastasis. A palliative operation only was possible.

Another colossal handicap is an utter absence of local disturbance, combined with a preponderance of general symptoms, one of the most notable of these being persistent and unyielding fatigue. Particularly should this be regarded with suspicion when noted in a middle-aged individual who should be progressively improving after an acute febrile attack.

We should not be deceived by the patient's age, as gastric carcinoma not infrequently attacks those in early life.

This study proves the fallacy of the belief still prevalent in the medical profession, that the presence of organic structural pathology must needs result in continued symptoms; for one of the most deceptive phases in these cases is that of marked intermittency of symptoms, particularly in the early stages of the case.

It is also well to remember that even in those cases which ultimately show the most malignant type of growth, the early symptoms are no worse than those encountered in mild benign disease. In short, it is a melancholy fact that in the early stage there are no symptoms pathognomonic of malignancy.

Emphasis has been laid upon the fact that the character of pain cannot be depended upon to be helpful, as every type has been encountered in this group. As for its location, the greater number had pain in the upper abdomen, in the epigastric area.

The appetite is in most cases appreciably diminished, especially in the later stages, while nausea and vomiting appeared at some stage of the disease in the majority of cases. Hematemesis and tarry stools were the rare exception. Occult blood is rather constant, and in my opinion is one of the most dependable objective signs. Great loss of weight was an outstanding finding.

Localized tenderness, anemia, motor and secretory dysfunction, the latter presented as achylia in the larger number, palpable mass, male sex, white race, middle age, and x-ray findings, at present constitute the most dependable evidence to justify at least suspicion of gastric cancer.

A long-existent tumor, cachexia, and age *per*

se, do not constitute valid contraindication for surgery, for it has been our experience that in some cases which appeared hopeless, radical and life-saving operations could be applied; while in not a few others, phenomenal improvement with relief of symptoms was brought about by palliative surgical interference in the presence of non-resectable growth with metastases. In many instances we were unfortunately unable to differentiate ulcerating carcinoma, gastric ulcer undergoing malignant degeneration, and benign gastric ulcer.

You will note the number of cases studied, and the number with which we were able to communicate. I am convinced that practically every case reported by the surgeon at operation as "inoperable" for various reasons, has since died.

While it is distressingly true that as regards percentages and gross numbers the mortality rate in gastric cancer is overwhelming, yet we must not fail to realize that every case reported as a cure represents the actual saving of a life; therefore, unless absolutely contraindicated, operation should be undertaken, realizing that all is to be gained and nothing lost. Undoubtedly resection is the operation of choice in gastric cancer.

There is no typical symptom, sign or syndrome which may not herald the onset of malignancy. Hence the only way to meet this unsatisfactory state of affairs is to take nothing for granted; institute intensive, successive examinations and continue to keep the patient under observation. The wider our experience in dealing with gastric cancer, the less our surprise at contradictory, misleading and uninformative findings.

Let me put to you this query: Is it wise to bring about world-wide cancer-consciousness? Or would it be wiser to continue a crusade for periodic examinations?

Finally, the successful solution of this intricate and baffling problem will be achieved only by continued and combined attacks from every angle; the internist approaching it from the standpoint of clinical medicine, subjective symptoms, objective signs, gastric and stool studies, and all other clinical methods in his domain; while experts from the fields of surgery, chemistry, pharmacology, bacteriology, pathology, serology, hematology, roentgenology, radium therapy, bring up the reinforcements of their skill. Certainly there is no branch of specialized work which has not its own part in the battle; and I cannot but belive that if each and every member of the medical and allied professions exerts himself to the limit of his ability in waging this war of extinction, ignoring controversial points, patiently accumulating relevant facts and definite evidence, we may at last triumph over the deadly scourge which daily, hourly, in every land and nation, mows down its thousands of the doomed.

PSEUDOHYPERTROPHIC PROGRESSIVE MUSCULAR DYSTROPHY*

PRELIMINARY REPORT OF CASES TREATED WITH GLYCOCOLL

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During my student and hospital resident days I knew from text-books and from lectures that there was such a disease as progressive pseudohypertrophic muscular dystrophy, but no actual cases were available for presentation.

About five years ago, in connection with my work as pediatrist to the Shriners' Hospital for Crippled Children, Philadelphia Unit, I was surprised to see many of these muscular dystrophy cases coming to the Outpatient Clinic with the report that they had been treated at various hospitals and had come here as a last resort, hoping that the surgeon could give them some ray of hope. It was distressing to see the pitiful plight of the parents of these children and no doubt a trying ordeal for the surgeon who was forced to tell them that the child suffered from a progressive disease and that no hope for improvement could be held out. The patients could be admitted only for such orthopedic correction as was necessary. In the past six years twenty-five children suffering from this disease and ranging in age from seven to fifteen years at time of examination were examined in the clinic.

AGE OF PATIENTS

Year	No.	Ages in Years
1928	5	7-15-13-7-3½
1929	3	11-9-no record
1930	3	12-12-8
1931	6	12-10-9-11-11-10
1932	3	12-11-14
1933	5	9-10-9-10-9

About this time there appeared in the literature an article by Brand, Harris, Sandberg and

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Ringer[1] on the use of glycine in this condition, followed shortly by Hough,[2] who used intramuscular injections of epinephrine and pilocarpine, and while he reports beneficial results, especially in his most recent paper,[3] I always have had a preference for mouth treatment in children whenever possible.

The muscular dystrophies are also variously known as idiopathic muscular atrophy, pseudohypertrophic muscular paralysis, primary dystrophies, the myopathies. The muscular dystrophies are divided into four principal types and are usually referred to by the names of the authors first describing them, but for the most part they all seem to be simply various manifestations of the same disease, differing only in the distribution of the affected muscle groups and in the stage of the disease.

(1) *Pseudohypertrophic (Duchenne) Type.*— This is the most common variety. Hough[2] gives the incidence of this type to be 6 per 100,000 of the total population in the New England states. It affects first the muscles of the lower extremity, especially the calves; next the glutei and sometimes the muscles of the upper half of the body as the deltoid, infraspinati, supraspinati, and erector spinae group. Later there is atrophy of the muscles of the upper half of the body not involved in the hypertrophy, especially the latissimi dorsi and the lower part of the pectoralis major. The thigh muscles are the next group to atrophy, after which there is a slow but progressive atrophy of other muscles, even involving those which are hypertrophied.

(2) *The juvenile (Erb) type,* in which there is early atrophy involving the scapulo-humeral group of muscles, is probably the least frequent variety. The muscles most commonly affected are the pectoralis major and minor; serrati magni, which causes a marked winging of the scapulae; rhomboids, trapezii, latissimi dorsi and later the upper arm muscles; although the deltoids, infraspinati and supraspinati may be hypertrophied until very late in the disease. It is very hard for the patient to raise his arms above his head. The pelvic girdle and thigh muscles may become affected.

(3) *In the facio-scapulo-humeral (Landouzy-Dejerine) type,* there is early involvement of the muscles of the face, which becomes devoid of expression and is therefore called "myopathic facies." There is also involvement of the orbic-

PROGRESSIVE MUSCULAR DYSTROPHIES

Types	Muscles First Affected	Muscles Hypertrophy	Muscles Atrophy	Muscles Normal
(1) Pseudohypertrophic (Duchenne)	Gastrocnemii	Gastrocnemii (calves) Glutei Quadriceps (occasionally) Adductors Erector spinae Infraspinati Supraspinati Deltoids Triceps	Flexors of thigh Latissimi dorsi Pectoralis major (lower part) Biceps Serrati	Face Forearm Hands Feet
(2) Juvenile (Erb)	Scapulo-humeral group	Deltoids Infraspinati Supraspinati Pelvic girdle	Pectoralis Serrati Rhomboids Trapezii Latissimi dorsi Thighs	Face Forearm Hands Feet Leg (except in late stage)
(3) Facio-scapulo-humeral (Landouzy-Dejerine)	Face and scapulo-humeral group	Deltoids Infraspinati Supraspinati	Orbicularis oris Orbicularis Palpebrarum Pectoralis Serrati Rhomboids Trapezii Biceps Triceps Latissimi dorsi	Forearm Hands Lower legs Feet Deep muscles of back Respiration Larynx Deglutition Mastication
(4) Hereditary muscular atrophy (Leyden-Mobius)	Back and Legs	None	Serrati Flexors of thigh Latissimi dorsi Erector spinae Infraspinati Supraspinati	Face Forearm Hands Feet

ularis palpebrarum, preventing complete closure of the eyelids, and of the orbicularis oris, which may cause difficulty in sucking and whistling, but not in mastication or deglutition. As atrophy progresses the lips protrude in a pendulous type, the upper extending beyond the lower (tapir mouth). The respiratory muscles are not affected. Next the atrophy appears in the muscles of the scapulo-humeral group as described in the juvenile type. It usually affects children at a much earlier age than the juvenile type.

(4) *In hereditary muscular atrophy (Leyden-Mobius) type,* there is early involvement of the muscles of the back and legs. Pseudohypertrophy is absent, otherwise it is very similar to the pseudohypertrophic type. As the disease progresses there is also atrophy of the muscles of the upper extremities. Clinically this differentiation of these types is interesting, but unimportant so far as the prognosis and treatment of the disease is concerned.

Several writers have included under this group a fifth type, the true hypertrophic type in which there is no atrophy but only a hypertrophy occurring early in the muscles with marked weakness. It usually first affects the shoulder girdle group of muscles and may also be related to the Duchenne type.

Some authors have also included other allied types as: (1) amyotonia congenita (Oppenheim's); (2) distal type (Gower's); (3) myotonia congenita (Thomsen); (4) myasthenia gravis; and (5) dystonia myotonica.

Most of these cases of progressive muscular dystrophy begin between the sixth and tenth years of life, although cases have been reported as early as two and as late as fifty years. It is very rare after puberty.

This condition is practically limited to children of parents who are very poor. I have never seen the condition in females, although textbooks report a ratio of about four males to one female. All of them have been of the white race, American stock, except one of Italian parentage. While the condition is supposed to be hereditary or familial, I have noticed that this is true in only four of twenty-three families. One theory of the hereditary nature of the disease is the belief that, as in hemophilia, the condition is transmitted to the male by the female. Crother[4] states that healthy women may bear dystrophic children by each of two healthy husbands and that it is unusual to observe cases in more than two successive generations.

In this disease, the physiology of the muscle plays an important role and when muscles are unable to metabolize the substances necessary for their growth and normal function there occurs a hypertrophy in some of the individual muscle fibers with proliferation of the nuclei. This is followed by atrophy, and as this is a complex degenerative process, hypertrophy and atrophy may be going on in the same muscle simultaneously in conjunction with loss of the transverse stria and vacuolation, an increase in the connective tissue and fat between the muscle bundles, and beginning weakness in the muscles. There is at first a true hypertrophy to compensate for this weakness, followed by the pseudohypertrophy and later atrophy, depending upon degree of involvement of the various muscle groups.

The endocrine glands may play an important part in this muscle metabolism. Timme[5] reports that four out of five cases showed distinct changes in the pineal gland, and "that there was some relationship between the muscular dystrophy and the pineal gland." Through the interdependence of the other ductless glands, by hypopituitarism, hypothyroidism and suprarenal insufficiency, many of the symptoms seen in cases of the muscular dystrophies may be produced.

Both the origin and the significance of creatine and creatinine are still much discussed questions (Peters and Van Slyke.)[6] About 95-98 per cent of creatine is distributed in the muscles and most of the remainder in the brain. Due to its distribution it probably serves as a nutrient to the muscles and is not one of the normal waste products of metabolism. Creatinine is the anhydride of creatine; and is a waste product formed from creatine. A large part of creatine is now supposed to exist in combination with phosphoric acid, in the form of phosphocreatine.

Milhorat, Techner and Thomas[7] state that patients with this disease show a creatinuria even when maintained on a creatine-free diet; that they excrete ingested creatine almost quantitatively (65 to 100 per cent). The inability to retain ingested creatine, they say, is in proportion to the severity of the disease.

In the study of these cases on admission to the hospital alternate cases were put on a creatine-free diet and on a diet containing 1.75 grams proteins per kilogram of body weight, the remainder of the calories being made up of fats and carbohydrates, approximately proteins 50

gm., fats 100 gm., and carbohydrates 150 gm. One week after admission, the administration of glycocoll was started. Five grams twice daily to children under ten years and 5 grams three times a day were given to children over ten years. The same dosage was continued at home after discharge from the hospital. Daily urinary creatine and creatinine determinations were made by the Folin method, and a marked rise in the output was noted twenty-four to forty-eight hours after glycocoll was started. In the milder cases this remained fairly constant for about two weeks, after which there was a gradual return to practically the original output which was then maintained during the stay in the hospital. The more severe the case the higher and more variable the output, with a much longer time necessary to show a decline in the output. The creatinuria is apparently not significantly altered by excessive fluid intake, diet, or exercises. In all cases the blood Wassermann was negative, the blood picture normal, the basal metabolism low, ranging from minus 3 to minus 10. The blood pressure was normal for the age. Blood chemistry cell determinations were normal except for a low phosphorus. The measurements of the arms and legs at monthly intervals showed practically no change.

While the clinical picture of an ordinary case is usually plain, definite and well-known, just as a review let me sketch for you the main characteristics.

A patient sitting upon the floor wishes to stand. To do so he must roll over upon his abdomen, rise to his knees and then pull himself up gradually by climbing upon his own legs hand over hand. This condition is often referred to as "Gower's sign." As he finally attains the erect position the abdomen is thrown prominently forward, producing a lumbar lordosis. His tottering uncertainty proclaims a progressive weakness with marked disturbance in gait which becomes the steppage type. The loose shoulder girdles are best demonstrated if the examiner places his hands under the axillae and tries to lift the patient. The sensation is as if an eel were slipping through one's grasp. The condition gradually becomes worse, the patient is bedridden from four to twelve years after the beginning of the disease, death usually resulting from some contributory cause.

In the past it was a hopeless condition to treat. Holt and McIntosh, in their new book, say that nothing will stay the course of the disease. Griffith and Mitchell recommend the employment of various endocrine products as those from the thyroid, pineal and pituitary, calcium lactate, high vitamin diets, and ephedrine and pilocarpine.

Milhorat, Techner and Thomas[7] in the treatment of these cases found that the administration of glycine (glycocoll) was followed by a marked increase in the output of creatine in the urine and the more progressive the disease the larger was the excretion of creatine.

Harris and his co-workers,[1] in 1929, also reported the same result with glycine and with guanido-acetic acid; but when they used others of the amino acid group as arginine, cystine and glutamic acid, no such results were produced.

Recently Mendelson[8] has reported the case of an adult whom he treated with cortin subcutaneously with marked improvement in a few months. Hough[3] has been using daily injections of 0.1 c. c. of 1 per cent solution of pilocarpine and 0.2 c. c. of an 0.1 per cent epinephrine. He feels that the treatment must be continued indefinitely and that even in spite of continued treatment the condition may progress. In the series treated by Voshell[9] better results are reported with pilocarpine and epinephrine than with glycine; but he suggests that the combined methods might offer still better advantages.

"A patient[10] (case reported in the *Deutsche Medizenische Wochenschrift*) writes that glycocoll retains its beneficial effect better than epinephrine-pilocarpine. The effect of glycocoll is probably dependent on its nutritive qualities. The reaction lasts only about two weeks, after which it must be resumed. No cure results."

Six cases have been treated by me with glycocoll that I have been able to see at regular intervals the past five or six years for re-examination, etc. The two case reports which follow represent the mild and severe types.

Case 1.—A boy, aged 9 years, has five sisters and one brother living and well. There is no history of this disease in the family. He has had the usual mild childhood diseases; but for about five years has noticed a weakness in his leg muscles which has been getting worse. About a year before I saw him it was quite an effort to go up or down a few steps. During this time also he noticed a weakness in his arm muscles and could not hold on to heavy objects. He had increased mobility of his shoulder joints. On admission his examination was negative except for the weakness mentioned, which was more marked in the right arm and leg. The reflexes were hypo-active. By x-ray the pituitary fossa was normal in size with some haziness around the posterior edge. The pineal gland could not be visualized. While he had difficulty in moving

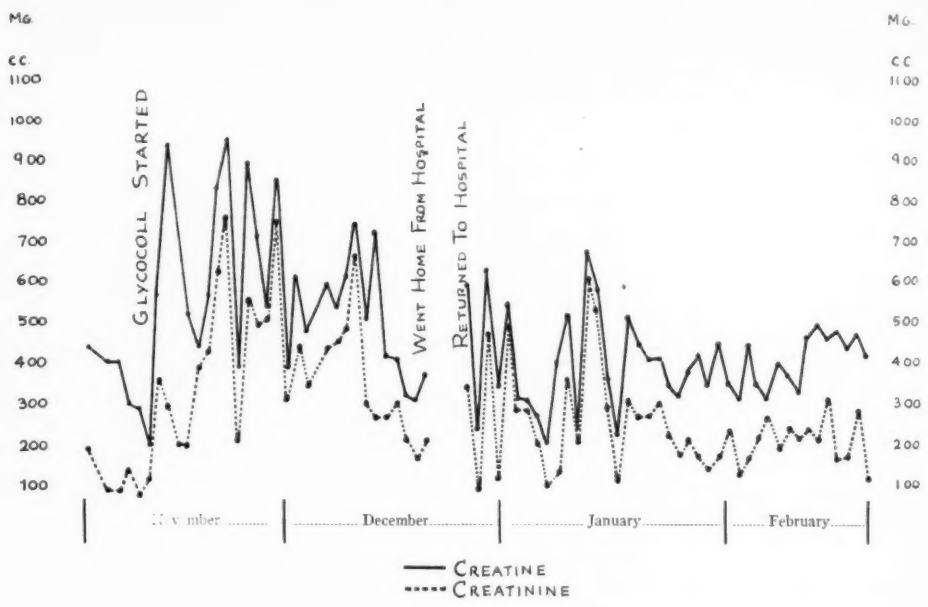

Chart 1, Case 1

Daily excretion of creatine and creatinine. November 18 to February 15. Each dot represents milligrams excreted in one day.

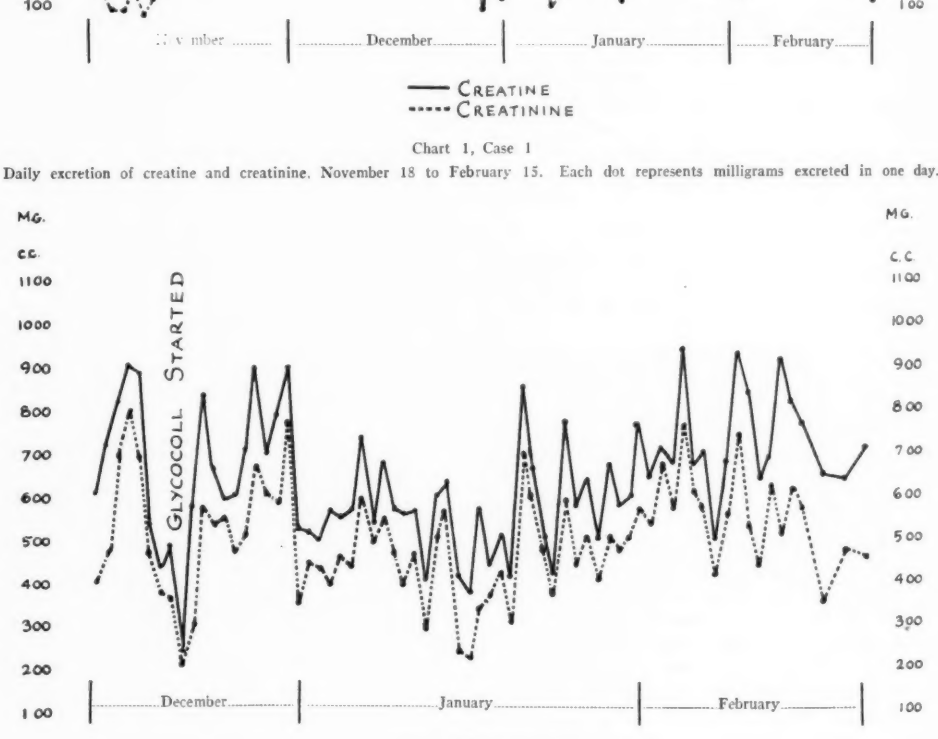

Chart 2, Case 2

Daily excretion of creatine and creatinine, December 15 to February 27. Each dot represents milligrams excreted in one day.

from a sitting to a standing position, he did not present the typical picture of climbing up on his legs. He was given 5 grams of glycocoll twice daily and postural exercises in the gymnasium, followed by general body massage three times a week. He showed wonderful improvement. By the end of the second month he reported that he never felt tired after his exercises and he could change from a sitting to a standing position without putting his hands on his thighs. The glycocoll treatment has been continued at home and he has continued to improve.

Case 2.—A boy, aged 13 years, has two brothers and three sisters living and well. One brother 26 years of age has the same disease and is practically bedridden. The patient had only measles and pertussis when a child. When he was five years old his parents noticed that he was different from the other children; that he tired very easily and had to hold his knees when going upstairs. He was treated in the out-patient department of several hospitals for a period of about five years; but as he was getting progressively worse, he was admitted to the Shriners' Hospital for Crippled Children, Philadelphia Unit, in 1931, where he was on a special diet including liver. He also received physiotherapy. He was discharged after six weeks with definite improvement in posture and chest expansion, but a year later the condition was approximately the same except for slightly increased weakness. He was then admitted to the Episcopal Hospital for glycocoll medication and received 5 grams three times a day. This boy was quite a severe type and had difficulty in assuming the erect posture even when climbing up on his legs. He had normal plantar reflexes, also cremasteric and abdominal. The knee jerk was absent; there was no Babinski; there was some sluggishness of the triceps and biceps, but with exaggerated weakness of the shoulder girdle and marked wasting of the sternal end of the pectoral muscles. The hand grasp was good; the Achilles very active. He is more of the Erb than the Duchenne type. The pituitary fossa is normal in size and appearance: anterior posterior, 6 mm.; depth, 7 mm. The dorsum sella is normal in contour and shows no evidence of erosion. The pineal gland is not outlined. He also received physiotherapy, and while his creatine and creatinine output has been much higher and more variable than is the usual course, yet his improvement has been such as to warrant continuation of the treatment at home.

	Case 1, Male		Case 2, Male	
	Adm.	Dischg.	Adm.	Dischg.
Hemoglobin per cent	78	80	85	80
Red blood cells	3,950,000	4,300,000	4,340,000	4,200,000
White blood cells	12,600	7,840	14,720	5,350
Neutrophils	86	56	72	63
Small lymphocytes	13	33	27	35
Transitional	1	0	1	2
Eosinophils	0	2	0	0
Blood sugar	104	72	90	94
Urea nitrogen	12.5	10.8	9.8	11.8
Urea	26.6	23.3	20.9	25.1
Creatinine	1.5	1.5	1.4	1.2
Phosphorus	2.0	1.12	2.7	2.9
Calcium	18.0	13.6	14.2	12.6
Basal metabolism	—3		—6	
Blood Wassermann	Negative		Negative	

MEASUREMENTS

Case 1	Adm.	6 Weeks	12 Weeks
Right Arm			
Biceps	7½	8	8¼
Midforearm	7½	7¾	8
Left Arm			
Biceps	7	7⅞	8
Midforearm	7⅜	8	7¾
Right Leg			
Midthigh	12¾	13¾	14
Calves	11	11	11
Ankles	6¾	6¾	6⅞
Left Leg			
Midthigh	12½	13	13¼
Calves	11	11¼	11¼
Ankles	6¾	6¾	6⅞
Case 2			
Right Arm			
Biceps	8¼	8¼	8⅛
Midforearm	8½	8½	8⅜
Left Arm			
Biceps	8¼	8¼	8¼
Midforearm	8¼	8¼	8⅜
Right Leg			
Midthigh	15½	15¾	15¾
Calves	11¾	11¾	11¾
Ankles	6½	6½	6½
Left Leg			
Midthigh	15¼	15¾	15¼
Calves	11¾	12	11¾
Ankles	6½	6½	6½

COMMENT

Progressive pseudohypertrophic muscular dystrophy is comparable to other metabolic diseases. In diabetes the body is unable to metabolize carbohydrates and when insulin is given in conjunction with a regular diet, it can entirely compensate for this disability. In the disease under discussion, we have a condition of disturbed muscle metabolism which is relieved by some of the amino acid derivatives. As in diabetes, treatment of muscular dystrophy must be continued for a long period of time to prevent relapse.

BIBLIOGRAPHY

1. Brand, E.; Harris, M. M.; Sandberg, M.; and Ringer, A. I.: Amer. Jour. Physiol., **90**:296, 1929.
2. Hough, Garry De N.: Progressive Pseudohypertrophic Muscular Dystrophy. Jour. Bone & Joint Surg., Oct., 1931.
3. Hough, Garry De N.: Progressive Pseudohypertrophic Muscular Dystrophy. J.A.M.A., **101**:2113, No. 27.
4. Crothers, Bronson: Clinical Pediatrics, **5**:63.
5. Timme, Walter: Progressive Muscular Dystrophy as an Endocrine Disease. Arch. Int. Med., **1**:79.
6. Peters, John P.; and Van Slyke, Donald D.: Quantitative Clinical Chemistry, **1**:455 (interpretations).
7. Milhorat, A. T.; Techner, Fritz; and Thomas, Karl: Significance of Creatine in Progressive Muscular Dystrophy and Treatment of this Disease with Glycine. Proc. Soc. Exper. Biol. & Med., **29**: No. 5, Feb., 1932.
8. Mendelson, Ralph W.: Cortin in the Treatment of Progressive Muscular Dystrophy. J.A.M.A., **102**:604.
9. Voshell, Allen F.: Progressive Pseudohypertrophic Muscular Dystrophy. Sou. Med. Jour., **26**:156, Feb., 1933.
10. H. (Anonymous, as it is an account of his own case): Zur Therapie der progressiven Muskelatrophie (Selbstbeobachtungen). Deut. Med. Wchnsche., pp. 1865-66, Nov. 24, 1933.

RELATION OF VITAMIN DEFICIENCY TO THE TOXEMIA OF PREGNANCY*

By ROBERT A. ROSS, M.D., F.A.C.S.,
Durham, North Carolina

So long as we use the term "toxemia of pregnancy," and so long as we are unable to demonstrate or isolate any toxin, we are at liberty to look in any and all directions for evidence for the solution of the problem.

McLester, in his official speech before the American Medical Association, alluded to the possibility that many of the answers to the disease riddles may be found in the dietary deficiency syndromes, and pointed out that some of our obstetrical problems were being and had been investigated with this in mind.

In previous papers we have given our statistics, and emphasized the similarities and differences between our series of late toxemias, drawn largely from rural North Carolina, and those of other men in different localities. Lately our attention has been focused on certain characteristics which seem fairly constant. To state it poorly, we have been struck with the number of patients in eclampsia who are in a very poor state of nutrition. On checking the localities from which they are referred, and on reviewing the state morbidity and mortality statistics, we observe that in the same areas in which eclampsia occurs most often we are apt to find a larger percentage of pellagra and similar diseases. With this fact in mind, and with some experience in treating the early toxemias and polyneuritis, we have tried to analyze our records and see whether they correspond with the opinions of others.

It seems proper that we should evaluate what information is at hand that may be significant. Strauss, McDonald and Castle[1 2 3] have shown that dietary deficiencies can account for both hypochromic and macrocytic anemias of pregnancy, and submit facts which they think favor the view that polyneuritis of pregnancy is a deficiency disease and may be satisfactorily treated as such. Beckwith and Lufkin[4] reviewed the literature and collected fifty-two true cases. In practically every instance the neuritis was preceded by pernicious vomiting. They point out the similarity in the clinical and pathological nerve changes in pregnancy and in the changes resulting from beri-beri and pellagra. Plass and Mengert[5] have added other cases and carry the reasoning in the same direction, and point to the hope that a more helpful therapy is at hand. Wilson and Garvey, Hoffman and McGoogan, among others[6 7 8] have also written on this subject.

In the past five years we have seen three known cases of polyneuritis of pregnancy. One terminated fatally the day after admission to the hospital undelivered at 4½ months. Another recovered the use of her lower extremities one year after therapeutic abortion. The third was four months convalescing after spontaneous abortion at four months. In all three, pernicious vomiting was present. The admission diagnosis of the fatal case was acute yellow atrophy of the liver.

We have seen two spurious cases in an experience similar to Plass and the German writers, in which the nerve symptoms were probably due to a drug used as an abortifacient. Both recovered.

We all know that rats are especially prone to polyneuritis and that intravenous liver extract is quite beneficial, but there is difficulty in impregnation of such rats, and the duration of pregnancy is so short that polyneuritis cannot be induced and cured during pregnancy. However, we hope that we shall soon have aid from this source. In the meantime vitamin B should be used as a prophylactic in pernicious vomiting as suggested by Strauss and McDonald.

Those who still hold to the idea of infection in eclampsia can find interesting facts in studying infections in vitamin deficiency. McConkey and Smith,[9 10] in studying the production of tuberculosis in the intestines of guinea pigs, found that "the ingestion of tubercle bacilli by the guinea pig is not the sole factor in production of tuberculosis," and in their opinion an adequate supply of vitamin C usually protects these animals against ulcerative tuberculosis. Later in an effort to produce peptic ulcers experimentally, they observed that diets deficient in vitamins A and B did not cause peptic ulcers if the supply of vitamin D was adequate, and in case of mechanical injury to the mucosa of the duodenum, healing was rapid and complete when the diet

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*From the Department of Obstetrics and Gynecology, Duke University School of Medicine.

was adequate, but was followed by peptic ulcer formation when the diet was deficient in vitamin C. After a most comprehensive review of the literature and a clear check on their own work, D. T. and Susan G. Smith[11] point out the relation of vitamin deficiency to focal infection. They conclude: "Studies suggest that a deficiency of certain vitamins results in the development of focal infection." The most important of these is vitamin A, which is frequently referred to as the anti-infection vitamin. C and G are next in importance and B and D are less important. There is no proof that E has any relation to infection. Infection is often the first symptom of vitamin deficiency and a higher level of intake is necessary to prevent infection than to promote growth. Pure vitamin deficiencies are rare in this country, yet partial, multiple, chronic deficiencies are probably quite common and may manifest themselves as recurring focal infections. Ruffin and Smith,[12] in treating pellagra with certain liver preparations at Duke Hospital, and in reviewing the foods consumed by the patients prior to their development of pellagra, were impressed with the similarity between their diets and the diet which Goldberger and Wheeler used in producing pellagra in convicts in Mississippi. An estimate showed this to be a 2,900 calorie diet consisting of fat meat, field peas, rice, hominy, grits, cane syrup, brown gravy and lard and corn meal, which shows a diet deficient in vitamin G (B_2), also A, C and D, and in iron, calcium, phosphorus and complete proteins.

The type of patient that we see in eclamptic convulsions is the patient who subsists on a diet similar to the above. We have therefore made an effort to correlate any facts that may have a bearing on the production of eclampsia. We must call attention to the work of Mellanby[13] and his coworkers. Their observations are always welcomed by obstetricians. His work on the incidence of puerperal sepsis in deficiency diseases, both experimentally and in the hospitals, has been provocative of much good. The later monograph[14] is a most inclusive discussion. Harowitz[15] has recently given us a splendid review on the subject of eclampsia.

The last report of the Bureau of Vital Statistics in the State showed 74,743 births and 33,069 deaths. Of these deaths, 640 were due to diseases of pregnancy, childbirth and the puerperal state. There were 236 deaths due to toxemias of pregnancy and 76 from postpartum hemorrhage, a certain percentage of which would have a toxemic background. During the same year there were 696 deaths from pellagra, of which 470 were female and 275 were in the child-bearing age. We wrote to our confréres in five widely divergent localities within the State and found that there were 44 toxemic deaths. These counties had a total of 77 deaths from pellagra, 35 of which were in women in the child-bearing age. This seems significant at first glance, but probably means simply that both these diseases are evident throughout the State and simply parellel each other. In our county there were:

Total births	1748
Maternal deaths	10
Deaths from toxemia	5
Total deaths, county	773
Maternal deaths	1.3 per cent of total
Maternal mortality	0.55 per cent

We have investigated our hospital records (Watts, Salvation Army and Duke) for the past four years and in this find that during the past four years 160 females have been treated for pellagra. Only seven of them were pregnant and one of the seven had symptoms of late toxemia. One patient had sprue. We are at present studying the fertility of individuals with pellagra. During the same period of time there were 2,120 patients delivered in these hospitals and 174 patients with late toxemia of pregnancy. Our mortality rate for this complication is about 13 per cent.

At our request Susan Smith made the following list to insure against dietary deficiency, so far as the vitamin and accessory factors are concerned. She suggests the following additions to the average diet:

6 brewer's yeast tablets
8 ounces tomato or orange juice
1 to 2 pints of milk
2 teaspoonsful lactose
3 ampoules of plain haliver oil (substitute haliver oil supplemented with viosterol after fifth month).

Pellagra can be produced experimentally by diet control. We do not think we can duplicate this in eclampsia. However, it has been known for a long while that by proper supervision of

the minerals, vitamins and energy producing foods in the diet eclampsia incidence can be reduced. We simply state that the pellagra and eclampsia ratio is clearly parallel in North Carolina and we are trying to find any factors which may be helpful in the solution of our problem of the prevention of eclampsia.

BIBLIOGRAPHY

1. Strauss, M. B.; and McDonald, W. J.: Polyneuritis of Pregnancy: A Dietary Disorder. J.A.M.A., **100**:1320-1323, April 29, 1933, and references.
2. Strauss, M. B.; and Castle, W. B.: Studies of Anemia of Pregnancy. Lancet, **1**:1198, June 4, 1932.
3. Minot, George R.; Strauss, M. B.; and Stanley, Cobb: Alcoholic Polyneuritis: Dietary Deficiency as a Factor in its Production. New England Jour. Med., **208**:1244-1249, June 15, 1933.
4. Berkwitz, N. J.; and Lufkin, N. H.: Toxic Neuritis of Pregnancy: A Clinicopathological Report. Surg., Gyn. & Obst., **54**:743, May, 1932.
5. Plass, E. D.; and Mengert, W. F.: Gestational Polyneuritis. J.A.M.A., **101**:2020-2022, Dec. 23, 1933, and correspondence.
6. Wilson, K. M.; and Garvey, Paul: Polyneuritis Gravidarum: A Presumable Toxemia of Pregnancy. Amer. Jour. Obst. & Gyn., **23**:775-787, June, 1932.
7. Huffman, L. O.: Presumable Toxemias. Neb. State Med. Jour., **17**:422-424, Oct., 1932.
8. McGoogan, L. S.: Toxic Neuritis in Pregnancy. Lancet, **52**: 735-740, Dec. 15, 1932.
9. McConkey, Mark; and Smith, D. T.: The Relation of Vitamin C Deficiency to Intestinal Tuberculosis in the Guinea Pig. Jour. Exper. Med. Art, **58**:4, pp. 503-512, 1933.
10. Idem: Arch. Int. Med., **51**:413-426, March, 1933.
11. Smith, D. T.; and Smith, Susan G.: Relation of Vitamin Deficiency to Focal Infection. Trans. Amer. Clin. & Climatological Assn., 1933.
12. Ruffin, J. M.; and Smith, D. T.: The Treatment of Pellagra with Certain Preparations of Liver. Amer. Jour. Med. Sci., **187**:512, April, 1934.
13. Green, H. N.; Pindor, G.; Davis, G.; and Mellanby, E.: Brit. Med. Jour., **2**:595, 1931.
14. Mellanby, Edward: Nutrition and Child Bearing. Lancet, **2**:1131-7, 1933.
15. Harowitz, David H.: Toxemias of Pregnancy. New Eng. Jour. Med., **209**:1281, Dec., 1933.

DISCUSSION (*Abstract*)

Dr. Geo. A. Mayer, New Orleans, La.—There are two types of women, namely: the short, stocky type, and the thin, frail, delicate women, who are so because of individual feeding peculiarities. Many have a normal low base line blood pressure, 110 systolic or lower. On becoming pregnant a fair percentage show a gradual rise in blood pressure, beginning about the sixth month, and towards the ninth a thirty-point rise is not unusual. This blood pressure increase is significant of poor cooperation on the part of the liver, primarily, and the kidneys secondarily.

If the diet is not changed and strictly supervised, pre-eclamptic toxemia quickly ensues. These are especially prone to eclampsia on the whole. The system has not had time to set up a compensatory mechanism. The value of diet in lowering the blood pressure is apparent in such patients.

The diet is simple enough: plenty of milk, fresh fruit, and other vitamin-containing foods, with blood pressure readings at frequent intervals to guide the obstetrician in bringing mother and baby through the ordeal of labor with a minimum danger and damage.

THE OCCURRENCE OF DIFFERENT TYPES OF MENTAL CHANGES IN BRAIN TUMOR*

By ERNEST SACHS, M.D.,
St. Louis, Missouri

There is a very general idea among the laity, and not a few general practitioners, that a patient with a brain tumor inevitably must have some mental disturbance, and that, if a tumor is removed, deficient mentality or some other type of mental disturbance is certain to follow. These mistaken ideas are some of the factors that keep brain tumor patients from the surgeon.

In the very last stages of many brain tumors, when increased intracranial pressure has been unrelieved, patients become stuporous and, at the very end, unconscious before they die, but this is a terminal affair and not one that interests us so much today.

There are certain regions of the brain in which tumors may develop and become very large without ever giving rise to any mental disturbance. This is true of the entire posterior fossa: cerebellar, pontine, and acoustic nerve tumors. Even in tumors of the cerebellum, in which one sees the most marked internal hydrocephalus, mental changes may be totally absent. I have had under observation now for three or four years a boy who has a marked permanent internal hydrocephalus as a result of a meningitis, whose mentality is absolutely unaffected.

In discussing those types of brain tumor cases that show mental changes, I should like to emphasize the fact that I am a neuro-surgeon and not a psychiatrist, so that I shall not attempt to use any psychiatric terms or classification, but this, I feel, is not a serious objection to my discussing the question since my tumor cases have been repeatedly examined by psychiatrists and studied, and invariably I have received the report that the mental findings were not characteristic of tumor and were identical with the changes seen in certain mental disorders. The two conditions which have to be most frequently differentiated are general paresis and the psychoses of advancing age. Whenever we have a patient with definite mental disturbance we get the opinion of a psychiatrist.

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I have found that the mental changes we see in brain tumor cases may be grouped under three headings.

First: The cases with memory defects. These patients seem to have forgotten recent events, while they remember quite clearly past events. Whether this loss of memory can be said to define the onset of the disease is an interesting point to speculate about, especially for those of us who are confirmed believers in cerebral localization. Are more recent events stored in a different area of the frontal lobe, or do patients forget such facts more readily because they have not been so firmly fixed by repetition as have the past events? I hold no definite views on this point, but it has always seemed to me this might be a fruitful line of investigation which might increase our knowledge of cerebral localization.

With this loss of memory there is also a lack of appreciation of judgment and insight. Such patients may be perfectly indifferent when told they have a serious illness or that they have to undergo a dangerous operation. In a number of instances, after satisfying myself that the patients would not be affected by what I told them, I purposely accentuated the danger and found total indifference. Some of these patients laughed about it and made some jocular remarks about the operation they were to undergo.

Still other patients, in addition, lose interest in their personal appearance, just as a general paretic does, and soil themselves with urine or feces. Whether this loss of sphincter control is an evidence of mental disturbance or merely due to involvement of the bladder center in the frontal lobe, I do not know.

At times the mental changes are so profound, either due to the length of time the lesion has been present, or to its size, that the patient reverts to the status of an infant. Some years ago I saw a young woman who had been treated for over two years for so-called encephalitis. She had a right frontal lobe tumor. She had been a very intelligent, fastidious, charming college graduate. When I saw her she lay in bed playing with a toy dog, was constantly soiling herself, and was not bothered by it, and had lost all her memory for both past and recent events, though her speech had never been affected. In the course of two or three weeks after removal of the major portion of her right frontal lobe her mind cleared and all her faculties returned. She remained perfectly well for about five years, when she had a recurrence and had to be re-operated upon. There was no loss of memory between the first and second operations, but the two years prior to her first operation have remained an absolute blank.

This type of memory defect occurs, as a rule, in frontal lobe lesions and more often in the right frontal lobe in individuals who are right-handed, hence have their speech mechanism located on the left side.

But a most troublesome problem is this: Why do some patients in whom the right frontal lobe is resected develop a memory defect and others remain absolutely unaffected? I have had this experience very recently. In a young woman I resected the right frontal lobe to remove an olfactory groove meningioma, and this young woman had slight but definite loss of memory and was quite facetious. In a boy I carried out the same procedure for a frontal lobe astrocytoma, and there was no evidence whatever of any mental defect.

Second: Memory defects similar to those just described associated with speech disturbances. Such disturbances occur when the lesion is situated in the left, rather than the right, frontal lobe. The character of the speech defect may vary; there may be a pure nominal aphasia or the aphasia may be more complete, a total so-called motor aphasia, but, if the lesion is frontal, understanding of speech is not affected. It is of great interest, at least to surgeons, that pressure alone may produce the same mental changes as destructive lesions. Such a case was reported by Dr. Andrew B. Jones and myself before the American Neurological Association in 1932. Due to a closure of the foramen of Monro, the patient developed hydrocephalus, and in the course of six months degenerated mentally, and presented a picture that Dr. Jones described as follows:

"The patient was completely disoriented as to time and place and was making plans to carry out military orders. He talked incessantly and in a facetious manner. His thinking was very disconnected. Many of his facts were correct, but not correlated. His retentive memory was nil, as was his memory for recent events. Everything was treated as a joke, and when a lumbar puncture was done he said that it was carrying the joke too far. He filled in memory defects by much fabrication and confabulation. He urinated and defecated in bed. There were no periods of excitement, no delusions or hallucinations. His mental state was that of a very widespread diffuse cortical lesion, that is, there were intellectual impairment, loss of judgment and poor retentive memory."

After re-establishing the opening between the two lateral ventricles, the patient cleared up

completely and has been able to resume his work as an expert accountant. Some weeks after his operation, in order to determine if the opening was patent, I repeated the ventriculogram and immediately many of the patient's symptoms returned. The air passed from one ventricle to the other, and then out through the incision in the right frontal lobe into the subdural space. Whether dilatation of the ventricle or pressure of the subdural air was responsible for the return of symptoms was not perfectly clear; certainly, however, with the release of the subdural air the patient cleared up within twenty-four hours. This observation, combined with other similar though not as clear-cut ones, has led me to believe that the cortical portion of the frontal lobe contains these centers rather than the deeper portions that lie immediately about the ventricle, just as other functions in other portions of the cerebrum have their centers also in or near the cortex.

Third: Cases with various types of hallucinations, or what we neuro-surgeons prefer to speak of and think of as subjective sensations. When a patient has an irritative lesion which involves or presses upon the temporal lobe or the occipital lobe, he may have convulsive seizures which are initiated by a sensory aura. Attention to such attacks was first drawn by Hughlings Jackson, and subsequently, some twenty years ago, Foster Kennedy wrote an admirable paper about these so-called temporal fits. When the auras are not followed by convulsions they may be mistaken for hallucinations without any organic basis, and valuable time may be lost before the correct diagnosis is made.

When the lesion is in the posterior part of the first temporal convolution, there may be hallucinations of hearing. Over and over again the patient may experience the same auditory disturbance; if the lesion involves the temporal lobe more anteriorly there may be gustatory or olfactory auras, while if the region in the middle of the lobe is involved, those fascinating attacks, designated by Jackson as dreamy states, occur. These hallucinatory phenomena seem no different, whether they have a definite pathological basis or whether there is no demonstrable lesion. The most valuable finding that clinches the localization is the finding of an eye field defect.

The visual hallucinations vary somewhat with the location of the lesion in the visual pathway. If the lesion affects the temporal portion of the visual tract, the hallucinations are more those of form, people, animals, or some peculiar object. If the occipital lobe is more affected, the hallucinations are more those of color. The patient may see colors which appear from one side as flashes of light. With these two types of hallucinations, there are corresponding disturbances in the visual fields. It is of interest and great importance to realize that patients with these hallucinatory phenomena, due to a tumor, may be otherwise entirely normal mentally. As these hallucinations frequently occur at considerable intervals, the patients may not only appear quite normal, but themselves be quite unaware that anything serious is the matter with them.

To make this point somewhat clearer and more striking, I quote two cases very briefly.

A hotel proprietor, in a small town, had for many years noticed a peculiar sound like the ringing of bells. This would come on at any time. This auditory hallucination, as happens so commonly in these cases, was always of the same character; that is, he never heard any other sounds. After many years the lesion became sufficiently large to encroach on his post-central gyrus and give him general signs of pressure. In all these years, and even when he developed pressure signs, his mind was perfectly clear, and he showed no other mental disturbances. He attended to his business without any difficulty.

A second case was that of a school teacher who, while going to school, had typical attacks of dreamy state in which she imagined she was a character in an Elizabethan play. With these attacks she had a partial left homonymous hemianopsia. She carried on her teaching during the time she had these hallucinations. They in no way interfered with her work and in every other respect she was perfectly normal.

The first patient had a tuberculoma of his left first temporal convolution. The second had an angioma of her right temporal lobe.

If the lesion is on the left side there may be speech disturbances, but this is not an invariable accompaniment. When the tumor is small, or after it has been removed, speech may not be affected.

These, then, are the only definite mental changes that may occur due to a brain tumor, and, though they may indicate very definitely

where the lesion is located, they give no indication *what* the nature of the lesion is.

A word must be said about the mental dullness produced by increased intracranial pressure. This is a general sign of pressure and does not indicate where the lesion is located. With the mere relief of pressure this symptom may disappear entirely. The mental dullness may, however, mask a mental defect, just as when a smoke screen has been blown away there comes into view the destroyer which produced the smoke screen.

In our series of tumors in the past years the incidence of frontal lobe lesions was about 15 per cent, and the incidence of temporal lesions was 12 per cent. Since the hallucinations occurring with temporal lobe lesions are frequently the only mental disturbances these cases show, one may be quite justified in saying that the only group of brain tumor cases that show marked mental changes are the frontal tumor cases, and these comprise, in our series, only 15.2 per cent.

In summing up, I would say:

(1) The mental changes occurring in brain tumors are indistinguishable from those produced by vascular disease, syphilis, or a psychiatric condition associated with organic brain disease.

(2) Mental changes are a rare symptom of brain tumor and do not occur in more than 15 per cent of the cases.

DISCUSSION (*Abstract*)

Dr. Edgar F. Fincher, Jr., Atlanta, Ga.—By far the most frequent mental symptoms in frontal lobe lesions are those of personality changes. There is a frank change in the individual's make-up, usually a loss of interest in all former activities, a frank indifference to personal and domestic interests, and later a disorientation for time and place. The sluggish cerebration, with a lack of retention for recent events stands out against acts of violence or maniacal tendencies of the functional cases. I do not agree with Dr. Sachs as to the involvement of the bladder center as an answer to the sphincter disturbance in these cases. This is to me in the same category as is their carelessness in attire or lack of interest in their usual mode of living. In some frontal lesions lobectomy has been necessary. In these cases, following tumor removal, sphincter disturbances have disappeared with the other mental symptoms. Occasionally one sees mental symptoms associated with lesions of the posterior fossa. Such mental changes are of misleading localizing value, and in the absence of any other findings ventriculography is the only recourse.

FURTHER OBSERVATIONS ON PRENATAL MEDICATION AS A POSSIBLE ETIOLOGIC FACTOR OF DEAFNESS IN THE NEW BORN*

By H. MARSHALL TAYLOR, M.D.,
Jacksonville, Florida

That 3,000,000 of the estimated 10,000,000 deaf persons in the United States are children is an arresting assertion. This estimate has no doubt greatly stimulated the growing interest which the otologist has manifested during the last decade in the various phases of deafness and in its etiology. Reporting to the National Research Council, the committee on statistical studies of the children in public schools for the deaf[1] stated that 62.15 per cent, or 3,334 of the 5,348 deaf children examined by it, were classified as congenitally deaf, and also that congenital syphilis is only a minor causative factor of deafness. McCarty,[2] after studying the syphilitic child closely for seventeen years, also concluded that there is no proof of an abnormal tendency to deafness in congenital syphilis. In his functional testing of more than a thousand subjects he found normal hearing in practically every one who had not had otitis media. Such findings invite a persistent and exhaustive study of the etiology of that type of deafness which is broadly classified as congenital deafness.

Despite the fact that modern text-books on otology point out the selective action certain drugs have for the auditory apparatus, otologists have virtually ignored the possible damage to the ear of the fetus which these drugs may cause when administered to the pregnant woman. That quinine, the salicylates and alcohol can have a permanent influence on the auditory nerve and that quinine in particular has a predilection for this nerve are established facts. Politzer[3] stated that the action of drugs circulating in the blood affects the eighth nerve more often than any other of the nerves of special sense. He stated further that the predilection which quinine has for this nerve causes the most severe pathological changes leading to deafness of varying degree and even to permanent loss of hearing in one or both ears. The transmission of these drugs through the placental circulation

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and the consequent possible damage to the auditory nerve of the fetus suggest an etiologic factor of deafness in the new born.

Drug idiosyncrasy is peculiar to many persons. Even 5 grains or less of quinine sometimes cause pronounced symptoms such as cutaneous eruptions, elevated temperature, marked tinnitus and deafness. These reactions seem to be purely individual in many cases and without consequence, so far as the offspring is concerned. A cursory review of the literature, however, disclosed reports of 18 cases of fetal death attributed to the toxic effect of quinine administered during labor, and they were replete with references to the idiosyncrasy of the mother for this drug.

Degenerative changes in the delicate mechanism of the ear due to quinine, the salicylates and alcohol have been reported by Wittmaack,[4] Beck,[5] Haike,[6] Lazinier,[7] Klugkist[8] and others. Lazinier[7] stated that quinine is the principal drug that causes aural symptoms, the salicylates ranking second, and he found that permanent deafness may result from the use of quinine and the salicylates in persons who are especially susceptible to the toxic action of these drugs. Wittmaack[4] reported degeneration atrophy of the ganglion cells and nerve fibers in the basal coil of the cochlea and similar changes in the lamina spiralis resulting from the administration of quinine and concluded that deafness is permanent when the basal coil of the cochlea is injured. Ophthalmologists and otologists seem to agree that the deafness and amblyopia caused by quinine and the salicylates are due to the contraction of the blood vessels of the internal ear and the retina, the resulting ischemia, lack of nutrition and anoxemia causing degeneration of the ganglion spiralis, the organ of Corti and the retina.

That the placenta is permeable to drugs is well established. By experiments on animals to determine the effect of barbiturates on the embryo and on pregnancy, Dille[9] recently showed that the placenta presents no barrier to the passage of barbital or amytal in guinea pigs, rabbits and cats. In numerous cases of congenital morphinism the effect of morphine on the human fetus has been demonstrated. Pettey[10] reported that the new born baby of a mother who is an addict to morphine is likewise an addict and he declared that the child of a mother who uses opium should be given an opiate for the first three days after birth to avoid the shock and collapse incident to the abrupt withdrawal of opiates from an addict, since severance of the placental circulation shuts off the supply of the narcotic. Burnett[11] suggested similar treatment for infants whose mothers are addicted to morphine. Cyanosis of the new born child, a condition which offers another proof of the permeability of the placenta to drugs, has caused practical abandonment of the use of twilight sleep in the practice of obstetrics.

Of the drugs known to affect the ear, sodium salicylate, according to Porak,[12] was found in the urine of infants when it had been given to the mother thirty minutes before delivery and it continued to be present for as long as three days, the concentration being greater several hours after birth than at birth. Nicloux[13] demonstrated alcohol in the blood of the umbilical cord in practically the same concentration as in the maternal blood when it had been given in milk one hour before delivery to women in labor. He reported that the placenta acts as a dialyzer of drugs present in the maternal blood and that such crystalloid substances as quinine and the salicylates, passing through the epithelium of the placental villi, may be found in the same strength in the fetal and maternal circulations.

Quinine, the chief drug causing aural symptoms, was found in the urine of 16 of the 17 babies examined by Dilling and Gemmel[14] after quinine had been given the mothers to induce labor. They reported finding the drug in the urine of the fetus six to twelve hours after the last dose was administered to the mother and observed that a concentration of quinine which may be toxic to the fetal tissues may persist in the fetus many hours after the wave of secretion in the maternal urine has subsided, due probably to the slow return of the drug to the maternal circulation or to inability of the fetal kidneys to excrete it in such a concentration.

Torland[15] reported a case in which the mother developed ringing in her ears, deafness and urticaria two hours after taking 10 grains of quinine sulphate. Several hours later she was delivered spontaneously of a stillborn child, although she had felt strong movements of the baby shortly after the quinine was administered. Autopsy performed on the baby showed acute tubular and glomerular nephritis. Torland[15] concluded that quinine, which is a known protoplasmic poison attacking preferably the cell protoplasm, may possibly through transmission from the maternal

blood to the fetal circulation cause such extensive injury to the fine fetal cells as to result in death.

In a case which resulted in a fetal death from quinine given the mother, King[16] found appreciable quantities of the drug both in the brain and in the urine of the fetus. Urticaria in a new born infant was attributed by Kirby-Smith[17] to quinine given the mother to induce labor.

The obstetrician has long since recognized the permeability of the placenta to drugs. The otologist, however, has been slow to take cognizance of the fact that the placenta presents no barrier to drugs which produce nerve deafness. That these drugs pass readily from the maternal to the fetal circulation in relatively large amounts and apparently produce the same effect upon the fetal tissues as upon those of the mother may constitute an important etiologic factor of congenital deafness. The reports cited indicate that in some instances the fetus in utero suffers from the toxic effect of quinine, a drug which has a marked predilection for the eighth nerve.

In a previous article[18] I reviewed a case which aroused my interest in this subject. The mother had four healthy children except that the fourth child was deaf. During labor when this last child was born, she was given castor oil followed by three 10-grain doses of quinine, an hour apart. She suffered such marked reactions, with deafness persisting for six weeks, that two years later when she discovered the child was deaf, she associated his condition with her own experience at the time of his birth. This case led me to make an extensive and all but fruitless search of the literature for references to prenatal medication and its relation to the fetal ear. The only reference found was a case report, quoted in full in a recent article,[19] which was made in 1870 by Roberts.[20] The keen observations of this country doctor of Washington County, Georgia, made nearly sixty-five years ago, are so germane to the present subject that they are worthy of brief review.

His patient, a 2-year-old girl, was the fourth child of normal parents and herself perfectly normal except for her deafness. When two months advanced in pregnancy with this child, the mother developed "chills and fever," which continued at intervals throughout the term of her pregnancy. She was given large doses of quinine, which affected her hearing and caused complete deafness for a period of three weeks. This author could "find no hereditary disease or any cause whatever why this child should be deaf, unless caused from quinine given the mother."

Two of the three cases which I now present also deal with quinine used in the treatment of disease concurrent with pregnancy. Both patients were under the care of Dr. Charles C. Grace and were inmates of the State School for the Deaf and Blind at St. Augustine, Florida. In each instance there was no family history of deafness or consanguinity, no abnormal reflexes or gait and examination of the ear drums showed the usual light reflex with no retraction and no displacement of the umbo or malleus.

CASE REPORTS

Case 1.—H. McL., a girl, aged 15 years, had no hearing so far as could be determined. Her two brothers and her sister were normal. The mother had typhoid fever when about 12 years of age and "was given quinine to break the fever." She became extremely deaf and remained so for the duration of the fever, a period of three or four weeks. Several times afterward she took quinine for colds and each time a small dose produced intense ringing in her ears and partial deafness. During the eighth month of her pregnancy with the deaf child she was treated for influenza with large doses of quinine, given over a period of twenty-four hours. Pronounced deafness resulted and the drug was therefore discontinued. After a period of three or four weeks, in which it was necessary to shout at her to make her hear, the deafness subsided. She took no quinine during her other terms of pregnancy. The child was apparently normal in every way at birth and grew and developed without serious illness or accident. Her deafness was recognized when she was about 18 months of age.

Case 2.—J. D., a boy, aged 5 years and a first child, was without hearing so far as could be detected. When the mother was four and one-half months advanced in pregnancy she developed a tertian malaria and was immediately started on quinine therapy according to the Bass method of treatment. After taking 30 grains a day for five or six days she became so deaf that it was necessary to lean over her bed and shout into her ear in order to make her hear. The deafness and tinnitus continued for four or five weeks. Since that time she has taken small doses of quinine in the home treatment of colds and each time a very small amount of the drug has produced a severe tinnitus and some loss of hearing. From birth the child has never given any evidence of hearing.

Case 3.—A. C., a boy, aged 4 years, apparently had no hearing at all. Otherwise, he showed every evidence of health. All reflexes were normal, the gait was normal and examination of the ear drums showed the usual light reflex with no retraction and no displacement of the umbo or malleus. The mother stated in a private interview that when she was four months advanced in pregnancy she wished to produce an abortion and on the advice of a neighbor took 50 grains of quinine in four doses at bedtime, an expedient which failed to bring about the desired miscarriage. There developed noise in her ears and deafness which persisted for several weeks and from which, after more than four years, she had not entirely recovered. She asked if her attempt to produce an abortion with quinine could have caused the deafness of her child.

A fourth case, now being investigated, is some-

what similar to *Cases 1* and *2*. It deals with pernicious malaria occurring concurrently with pregnancy and will be reported in detail at a later time. In this instance the mother in the seventh month of pregnancy was given 30 grains of quinine intravenously. She developed noise in the ear, deafness and urticaria. Her hearing improved somewhat after treatments, but has never returned to normal. The child, now 5 years old, is totally deaf, so far as can be determined.

In a recent study Heider[21] presented the dates of birth of several thousand children registered over a period of twenty years in sixteen schools for the deaf in the United States, correlating them only, however, with the unprecedented incidence of influenza in 1918. As I pointed out in an article[19] some months ago, these statistics also show that for the children registered in these schools, located in the South, nearly two and one-half times as many (849 to 359) were born during the second half of their respective birth years. This marked preponderance of dates of birth occurred during the season when malaria is most prevalent in this section, a disease for which quinine, a known cause of nervous deafness, is the specific. The corresponding figures for the schools located in the North showed a difference of only 56 (1,977 to 2,033), indicating no appreciable relationship between the date of birth and deafness, but in the South, even after the figures for the abnormal year of 1918 are excluded, the dates of birth still remained more than twice as numerous for the second half of the year. This seasonal difference, occurring only in the Southern section, particulary in Alabama and Florida, where malaria is markedly prevalent during that half of the year, suggests that the administration of quinine to the pregnant woman during the season when malaria is most prevalent may be a possible etiologic factor of deafness in the new born.

That the otologist has practically ignored the possible significance of prenatal medication in infant deafness may be due to the difficulty of early diagnosis. A child must be 2½ to 3 years old before a diagnosis of nerve deafness can be made and by that time the prenatal history has generally been dismissed. The usual history consists principally of whether or not there has been a family history of deafness, consanguinity, hereditary syphilis or meningitis. It seems, however, that inquiry regarding the drugs given the mother during pregnancy may yield information quite as important as whether the patient had a great uncle or a second cousin who was deaf. If a large number of otologists will in future, when dealing with cases of children with nerve deafness, be careful to include in the usual questionnaire the history of drugs administered to the mother during pregnancy, there may in due time be collected sufficient data to establish prenatal medication as an etiologic factor in such cases as come under the broad classification of congenital deafness.

Deafness from this cause could then be classified as deafness acquired *in utero,* a condition which may be characterized either by diminution in the function of hearing or by total deafness. In those cases in which patients show no deformities, give normal vestibular reactions to the whirling and caloric tests and have a family history containing no record of deafness and consanguinity, but in which they show on examination complete deafness or partial deafness with tone gaps or islands of deafness, data concerning those drugs used in prenatal medication which have a predilection for the auditory nerve are seemingly of particular interest.

The question of prenatal medication as a causative factor of nerve deafness offers a tempting subject for extended research, inviting the cooperative endeavor of the biochemist, the histopathologist, the internist, the obstetrician and the otologist. At the present time experimentation with animals is under way to ascertain the effect which drugs administered to the pregnant animal may have on the cochlea of the offspring.

SUMMARY

That certain drugs have a predilection for the auditory nerve is well established. Also, it is an accepted fact that drug idiosyncrasy may be an important factor in causing nerve deafness.

Quinine, the chief drug which causes this type of deafness, is frequently used during pregnancy, not only to induce labor but for incidental illness, especially in the South, for the treatment of malaria.

The placenta presents no barrier to the drugs which cause nerve deafness. They pass readily into the fetal circulation and may be toxic to the fetus.

Evidence has been presented which suggests that quinine, the salicylates and alcohol may be etiologic factors of deafness in the new born.

The possibility invites widespread investiga-

tion both clinically and experimentally and presents a fruitful field for research.

REFERENCES

1. Shambaugh, G. E.; Hayden, D. B.; Hagens, E. W.; and Watkins, R. W.: Statistical Studies of the Children in Public Schools for the Deaf. Arch. Otolaryng., **12**:190, Aug., 1930.
2. McCarty, Virgil W.: Otological Observations in the Congenital Syphilitic Child. Trans. Amer. Laryngo., Rhin. & Otol. Soc., p. 479, 1932.
3. Politzer, A.: A Text-book of Diseases of the Ear, p. 847. Philadelphia: Lea & Febiger, 1926.
4. Wittmaack K.: Ztschr. f. Ohrenh., **51**:161, 1905-1906.
5. Beck, K.: Experimentelle Untersuchungen uber den Einfluss von Bakterientoxinen und Giften auf das Gehororgan. Ztschr. f. Ohrenh., **68**:128, 1913.
6. Haike. H.: Experimentelle Untersuchungen zur Kenntnis der Wirkung des Natrium salicylicum auf das Gehororgan. Arch. f. Ohrenh., **63**:72. 1904.
7. Lazinier, J. E. J.: Contribution a l'etude des surdites toxiques. Thesis de Paris, 1899.
8. Klugkist, H.: Ueber die Alkohol-Vergfitung des Gehororgans. Thesis, Gottingen University, 1928.
9. Dille, J. M.: The Effects of Barbiturates on the Embryo and on Pregnancy. Jour. Pharmacol. & Exper. Therap., **52**: 129, Oct., 1934.
10. Pettey, G. E.: Congenital Morphinism, with Report of Cases. Sou. Med. Jour., **5**:25, Feb., 1912.
11. Burnett. S. C.: Morphinism in Pregnancy and the Unborn. Med. Herald, **39**:161, July 15, 1920.
12. Porak, C.: L'absorption des medicaments par le placenta. Jour. de therap., **5**:332 and 412, 1878. Paris: G. Masson, 1878.
13. Nicloux, M.: Le passage des substances chimiques de la mere au foetus. Obstetrique, **2**:840, 1909.
14. Dilling, W. J.; and Gemmell, A. A.: A Preliminary Investigation of Foetal Deaths Following Quinine Induction. Jour. Obst. & Gynec. Brit. Emp., **36**:353, 1929.
    Further Investigation of the Death of the Child Following Induction of Quinine. Ibid. **37**:528, 1930.
15. Torland, T.: Fetal Mortality After Induction of Labor by Castor Oil and Quinine. J.A.M.A., **90**:1190, April 14, 1928.
16. King. E. L.: Does Quinine in the Induction of Labor Have a Deleterious Effect on the Fetus? J.A.M.A., **101**:1145, Oct. 1, 1933.
17. Kirby-Smith, J. L.: Personal communication to the author.
18. Taylor. H. M.: Does Quinine as Used in the Induction of Labor Injure the Ear of the Fetus? Jour. Fla. Med. Assn., **20**:20, July, 1938.
19. Taylor, H. M.: Prenatal Medication as a Possible Etiologic Factor of Deafness in the New Born. Arch. Otolaryng., **20**: 790, Dec., 1934.
20. Roberts, John B.: Does Quinine, Given a Woman While Pregnant, Have Any Effect upon the Foetus? Richmond and Louisville Med. Jour., **10**:238, 1870.
21. Heider, Fritz: The Influence of the Epidemic of 1918 on Deafness: A Study of Birth Dates of Pupils Registered in Schools for the Deaf. Amer. Jour. Hyg., **19**:756, May, 1934.

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DISCUSSION (*Abstract*)

Dr. T. W. Moore, Huntington, West Va.—I had observed nothing of this kind in my own practice. However, I wrote to the superintendent in charge of our State Schools for the Deaf and Blind, and received a letter in reply stating that such a thing had never been suspected, and adding that "a rubric in the blanks should ask when admitting congenitally deaf children whether quinine had been administered to the mother during labor or pregnancy." I think that this should be done in all institutions admitting these patients.

Dr. Taylor has kindly let me see fifty letters written by prominent otologists throughout the United States, none of whom had observed or suspected the connection between the administration of quinine to the pregnant mother and the child born deaf. All, without exception, were convinced of the probable association and hoped for further investigation. All admitted that the possibility that the drug administered to the mother was a factor in causing deafness or impaired hearing in the new born child had been ignored. In one of these letters, one of our most eminent authorities says: "I believe that the cochlear ganglia are sufficiently developed at the fourth month to be affected by a poison (quinine); in fact, I believe they might be affected earlier."

I think that as the lawyers say, "Dr. Taylor has made his case," that the evidence he offers is most convincing. Undoubtedly the quinine as such enters the fetal circulation and it seems only reasonable to suppose that the same selective action for the nerve cells of the cochlea of the unborn child should be manifested as has been proven in the human and in other animals after birth.

I am glad that Dr. Taylor has called attention to the fact that syphilis plays only a small part as an etiological factor in congenital deafness. Physicians are entirely too prone to stop seeking for other causes of congenital defects when syphilis is found to have existed in one of the parents.

If animal experimentation proves the changes noted by Wittmaack, namely, "a degenerative atrophy of the ganglion cells and nerve fibers in the basal coil of the cochlea and similar changes occurring in the lamina spiralis," Dr. Taylor's observations and conclusions will be proven on an unquestionable scientific basis.

I hope that when this is brought about the investigation will be extended to include the salicylates and alcohol as well as quinine.

This must be done in a laboratory with highly trained observers in this field, since the ordinary pathologist might fail to detect the change.

I think that our Section, as well as the Southern Medical Association as a whole, is to be congratulated upon a contribution that promises so much, and which is presented at the meeting at which the observer was elected to the presidency of the organization.

Dr. E. M. Sykes, San Antonio, Texas.—Occasionally some truth is pointed out to us the banality and ubiquity of which is most embarrassing to those who would pride themselves on their keen power of observation and deduction. In such a way, Dr. Taylor has very forcibly brought to our attention the specific and destructive action of quinine and salicylates upon the delicate aural nerve tissue of the fetus. Strangely enough, this possibility as a causative factor in the congenitally deaf has been frequently overlooked and the case has been tabulated: "etiology undetermined."

The deleterious effect of quinine on the organ of hearing, especially in these persons hypersensitive to its toxic effects, has been observed for a long time. Therefore, it is not hard to imagine the irreparable damage which can be done to the fetal internal auditory apparatus, especially if the fetus happens to be allergic to the drugs in question. Abundant evidence to this effect has been presented by the essayist. The use of quinine to induce labor is condemned as unnecessary by obstetricians, especially since other methods are more effective and carry no possibility of drug toxemia. Further researches upon this subject would be welcomed.

Dr. Taylor is to be congratulated for presenting a possible cause of congenital deafness, which is nearly always overlooked by the otologist.

Dr. John T. Crebbin, Shreveport, La.—Dr. Taylor usually gives us food for thought. You will recall

some years ago his paper on "The Causes and Prevention of Otologic Conditions Following Swimming and Diving."

There is no doubt that many drugs have a deleterious effect on the fetus. Opiates will affect them, physically and mentally. Alcohol is without a doubt one of the most harmful, whereas quinine injures the auditory nerve.

As otolaryngologists, we should sound a warning to the profession and to the laity of the great danger in the promiscuous administration of harmful drugs and alcohol to the mother and the unborn child. By so doing, we shall prevent many complications.

DIATHERMY IN DISEASES OF THE EYE, EAR, NOSE AND THROAT*

By HENRY LOUIS HILGARTNER, JR., A.B., M.D.,
and
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In the last few years, a new field of therapy has been opened to all branches of medicine by the development of the high frequency current. We shall try to present briefly some of the newer methods of treatment that have been developed in ophthalmology and otolaryngology.

A high frequency current or diathermy is an oscillating current that has 10,000 or more cycles a second. In practice, the new machines give 1,000,000 to 1,500,000 oscillations per second. The d'Arsonval current has the lowest voltage, from 10,000 to 12,000 volts. It is used for coagulation and in administering heat into the tissues. Tesla current has a higher voltage, ranging from 35,000 to 45,000 volts. It is used more in fulguration and autocondensation treatments. The Oudin current ranges from 60,000 to 90,000 volts. Its use is to produce external heat to the tissues. The Tesla and Oudin currents may be applied with either bipolar or monopolar electrodes. The d'Arsonval current requires bipolar electrodes.

It is important to remember the effect produced by electrodes of different sizes. Two electrodes of the same size, placed at opposite sides of the head or a leg, heat straight through in an even and uniform manner. By using a large electrode on one side and a small one on the other, the heat generated will be in exact, inverse ratio to the square inch area covered. Therefore, to coagulate, we use a very small electrode at the site to be treated. The larger or negative electrode is placed on the neck or held in the hand.

In medical diathermy, we start with a small amount of current and gradually increase it to the point of tolerance of the patient. During the first fifteen minutes, the current is gradually increased to this point. These treatments last for 45 minutes. The patient should not feel any areas of undue heat or any sticking sensations.

The gradual increase of the current makes it possible to raise the temperature to a higher degree. A sudden elevation of temperature causes the skin and tissues to throw out heat protective mechanisms.

Bone and scar tissue offer the greatest resistance to the passage of diathermy, but bone retains its heat longer. Skin and tissue offer very little resistance to the current.

The action of medical diathermy is to produce greater vascularity of the parts and to raise the temperature. One theory is that as each ion passes through the tissues, it causes the cells to contract and expand, thereby increasing the exchange of waste products and nutriment to the cell.

One should remember that "medical diathermy should always be soothing and non-irritating. If otherwise, it is improperly applied."

Medical diathermy has been used by Wahrer, Hollander, Cottle and others in the treatment of otosclerosis, with improvement in about 1 per cent. In our small series of cases, the results have been discouraging.

Otosclerosis is a disease of the bone of the labyrinthine capsule, particularly in the region of the bone directly next to the niche of the oval fenestrum. A condition similar to varicose veins of the legs develops, in that vessels within the bone canals in this region become greatly dilated. Later sieve-like perforations develop in the bone. Since neither heat nor massage particularly helps varicose veins of the legs, it is easy to see why heat does not help in otosclerosis.

Some of the English text-books bring out that chronic catarrhal otitis media is becoming less and less of an entity. When one reads of the results obtained in this condition with physical therapy, one cannot agree with the English authorities.

The clinical picture in chronic catarrhal otitis media is a loss or impairment of the light reflex of the tympanum. The drum is somewhat thickened and slightly retracted. The hearing is im-

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paired, but is improved following inflation of the Eustachian tube. These patients give a history of repeated attacks of deafness, with feeling of fullness, pressure, and sometimes pain. There is also a marked tinnitus.

Chronic catarrhal otitis media responds nicely and promptly to diathermy treatment. There are other aural conditions that respond to diathermy: for example, acute otitis media. The important thing to remember is that diathermy is contraindicated where there is pent-up pus. Where there is free discharge, diathermy aids greatly in healing.

Diathermy in the nose, sinuses and throat can be used almost indefinitely if both medical and surgical diathermy are considered.

Much work is being done now on the treatment of acute coryza or acute rhinitis. Our technic is to shrink the turbinates with a cocain epinephrine solution. Diathermy is then applied over the nose for 45 minutes. Our results have been excellent.

All otolaryngologists are worried by patients who complain of being unable to breathe through their noses, chiefly at night. They also state that during the day first one nostril becomes obstructed, then the other. On examination, one will find quite enlarged, injected, boggy looking inferior turbinates. Sometimes they seem to touch the septum. The middle turbinates cannot be seen.

The inferior turbinates shrink down quickly in some cases. Others are more stubborn. Each middle turbinate is found to be in the same condition. All pathology about the nose and throat should be cleared up if possible, as local treatment with drops and sprays is very unsatisfactory in these cases.

A simple, effective technic for these cases has been developed by Sinsky. The turbinates on one side are anesthetized and contracted. The diathermy machine is set for 1,000 milliamperes. The patient holds the negative electrode and the positive electrode (especially designed by Sinsky) is pressed against the inferior turbinate. The current is turned on with the foot switch for five to eight seconds. The entire inferior turbinate in this way is covered with three or more applications. The patient experiences some pain, the amount of pain depending on the effectiveness of the anesthetic. Ordinarily the mucous membrane is not injured at all. Sometimes, if the contact has not been perfect, we get a small area of coagulation. The patient notices that for the next 24 hours that side may be more obstructed than usual. Not infrequently, due to interference with the sinus drainage on the treated side, some pain is experienced. When seen the following day, the turbinate may be covered with a thick, whitish mucous deposit which can be easily removed, giving the patient great relief. When this mucous deposit occurs, the results are apt to be better than in those cases where it does not develop. On the following day, the turbinate has already begun to shrink in size, and the patient feels much better. After the third or fourth day, the second side can be treated in the same way. Three or four treatments are sometimes necessary to achieve the desired results. Medical diathermy over the nose may be substituted for Sinsky's method in cases where his method is not applicable.

Surgical diathermy has many uses in the nose and throat. Nasal polyps can be removed with the snare and the bases may be coagulated. Nasal synechia, which always cause a great deal of worry and trouble, can be effectively dealt with by coagulating the base of the adhesion on each side and allowing the center to drop away. It is not wise to coagulate too much at one time.

Surgical diathermy can be used in treating pterygia, eliminating the necessity of hospitalization and the operating room. This method has not been as satisfactory for us as it has been in the hands of other investigators.

The treatment of malignant and non-malignant growths about the lids has been much simplified. We have recently removed several bleeding keloids that formed in the orbit of a negro whose eye had been enucleated because of extreme acid burns. The wound healed over with the minimum of scar tissue formation. Several small tumors of the caruncle have been removed by this method with excellent results.

Xanthomas about the lids have been a problem for the ophthalmologist, particularly where they are quite large. The danger of recurrence is great, as is the danger of severe scarring. By coagulating or dessicating a small part in successive treatments, the entire growth can be removed with the minimum of pain and discomfort.

Just as in other parts of the body, malignancies of the orbit or lids must be treated with great care and electrosurgery is playing a great role in the treatment of these cases.

To the person who is past forty years of age, or to those afflicted with nephritis, hemophilia, heart disease, or any constitutional malady that

contraindicates the surgical removal of the tonsils, the electro-coagulation method is ideal.

The procedure is simple. Cocain crystals are applied to the tonsil to be treated. After anesthesia has taken place, the patient holds the negative electrode. The positive electrode is passed into the tonsil simultaneously as the foot switch is turned on. The electrode passes in about 1/8 of an inch. When a definite white ring of about 1/16 to 1/12 of an inch has formed, the current is turned off. This takes about three seconds. We generally use about 450 milliamperes of current. The tonsil is treated from four to eight times in this fashion, depending on the size. Preferably, the tonsils are treated alternately every week.

The patient may experience some pain on the treated side for about 24 hours, or much less. Usually the pain has subsided by the next morning. The patient does not lose a meal, or a day's work. On examination the day following a treatment the tonsillar surface has a white membrane deposit, which resembles diphtheria. After three or four days this begins to slough off. It has completely disappeared by the end of the tenth day.

It may be well to stress the advantages of electrical coagulation of tonsils, as follows: (1) relatively little pain, (2) no hospitalization, (3) no bleeding, (4) no shock, (5) no loss of work, (6) no loss of food, (7) no injections of any kind.

The disadvantages are: (1) length of time for completion and (2) inapplicability to children.

Our oldest patient is 73 years of age, and she did not lose one day's work nor miss a meal.

The method is ideal in those cases where there is a small tonsillar remnant or tag following the surgical removal of tonsils. The patients are especially grateful not to have to undergo the surgical procedure again, and the method is much simpler for the physician.

I do not agree entirely with those who argue that this procedure should be reserved for only those who are physically unfit for the surgical removal of tonsils because of some constitutional disease.

In conclusion, we wish to stress the importance of diathermy in the treatment of eye, ear, nose and throat. We have been able to lessen the pain and discomfort in many of our patients by means of it, particularly in those patients with tonsillar tags, and in older patients with chronic tonsillitis.

BIBLIOGRAPHY

Wahrer, F. L.: Reduction of Turbinate Tissue by Medical Diathermy. Arch. Phys. Therapy, X-Ray and Radium, **14**: 228, 1933.
Morrison, Wallace: Uses of Medical and Surgical Diathermy in Otolaryngology. Arch. Phys. Therapy, X-Ray and Radium, **14**:230, 1933.
Silvers, Lewis J.: Electrosurgery in Otolaryngology. Arch. Phys. Therapy, X-Ray and Radium, **14**:494, 1933.
Braun, J.: Electrosurgical Enucleation of the Tonsils. Arch. Phys. Therapy, X-Ray and Radium, **14**:286, 1933.
Wahrer, F. L.: Electrosurgery and the Tonsil Problem. Arch. Phys. Therapy, X-Ray and Radium, **15**:605, No. 10, 1934.
Lederer, F. L.: Cancer of Head and Neck: A Critical Analysis of Available Therapeutic Methods. Arch. Phys. Therapy, X-Ray and Radium, **15**:517, No. 9, 1934.
Wahrer, F. L.: Physical Therapy in Diseases of the Ear. Arch. Phys. Therapy, X-Ray and Radium, **9**: No. 4, 1928.
Hollander and Cottle: Physical Aids in Partial Deafness. Arch. Phys. Therapy, X-Ray and Radium, **9**: No. 4, 1928.
Kelly, Howard: Advance in Electrosurgery. Arch. Phys. Therapy, X-Ray and Radium, **12**: No. 8, 1931.
Ward, G. E.: Advances in Electrosurgery. Arch. Phys. Therapy, X-Ray and Radium, **12**: No. 8, 1931.
Kelley and Ward: Electrosurgery. Philadelphia: W. B. Saunders Company.

DISCUSSION (*Abstract*)

Lt.-Col. Royal Reynolds, Fort Sam Houston, Tex.—Other branches of medicine are using diathermy extensively and it is very evident that in our special work in eye, ear, nose and throat conditions we are in step with the times in our use of diathermy. Several speakers before this Section have referred to the therapeutic value of diathermy. Dr. Roy, in his address, mentioned the subject. Dr. Terry believes that in electrosurgery we have a new and superior weapon against laryngeal and pharyngeal tuberculosis. Dr. LeJeune mentioned its use in the treatment of laryngeal lesions. It is very evident that there is a real place in our work for this comparatively new therapeutic measure as an adjuvant to other well recognized forms of treatment. We should not, however, be too hasty or go too far in our claims for all forms of diathermy and above all we should avoid misleading the public as to the value of this new electric treatment which obviously will appeal readily to the uninformed.

The use of the electric knife for the treatment of malignant disease is recognized as a definite advancement in surgery. It is deemed superior to the ordinary knife chiefly because of its action in killing cancer cells. As Mackenzie has said: (1) it prevents the operator from squeezing live cancer cells into the lymphatic vessels near by; (2) it prevents sewing the operative field with living cancer cells; (3) it destroys the bacteria of sepsis in the operative field by a coagulation of the surrounding tissues. In ineradicable cases of malignancy it is particularly valuable to destroy as much as possible of the malignant growth.

I have used the electric knife for the excision of intrinsic carcinomas of the larynx after laryngofissure and a submucous resection of the growth as described by Dr. Jackson the other day. In both cases a cure has apparently been effected, but I have noted from the literature that Mackenzie has condemned the use of the electric knife in laryngeal cancer because of the danger of necrosis of the thyroid cartilage.

I do not believe there are many men in our specialty

who think that electrocoagulation of tonsils should at the present stage of its development replace the usual means of enucleation of tonsils. Its chief disadvantages are, of course, the repeated sittings and the weeks of treatment that are required for a complete removal of the tonsils and I believe most adults who are good physical risks would much prefer to have their tonsils removed once and for all at one operation. However, I think that it is pretty well agreed upon that there are selected cases in which this method of tonsillectomy is of great value. In patients with tuberculosis I can well imagine that it is particularly valuable. Tonsillectomy in the tuberculous should be considered only when there are well recognized indications for the operation. In other words, we should be particularly cautious in submitting tuberculous patients to an operation which results in lowering of resistance, inability to take food, loss of weight and malaise. Any method which will forestall these postoperative symptoms in the tuberculous is of value. It is the opinion of men who used electrocoagulation for the removal of tonsils that the postoperative discomforts and other symptoms which I have mentioned are practically eliminated. As Dr. Hilgartner has pointed out, there are patients in which postoperative discomforts and the ordeal of a surgical operation must be approached with caution, for example, patients with hypertension, cardiac disease and the very aged.

I have found one particular use for electrocoagulation and that is in the stopping of hemorrhage following tonsillectomy, particularly in the latter part of the first week when the fossa is healed in and there is no bleeding point to ligate, but merely a general oozing. In those cases the application of the coagulation electrode has instantly and permanently stopped the bleeding.

As to its value in catarrhal otitis media, I am not in a position to come to any conclusion from personal experience. I can readily concede that it is a particularly efficacious means of applying heat to the middle and internal ear structures. Many remedies have been brought forward for treating catarrhal otitis media and have eventually proven valueless, and for that reason we should be rather cautious in advocating this new remedy as a cure for catarrhal otitis media. We all know that many remedies for otitis media will produce beneficial effects which are more apparent than real. The patients may say that they are better and feel better following certain forms of treatment, but when results are checked by careful testing of hearing we have found that actually improvement does not exist. It would be interesting to know just what effect diathermy has on a certain series of cases of otitis media, as shown by careful hearing tests before and after treatment. I do hope, however, that we shall find in diathermy a valuable therapeutic agency in catarrhal otitis media. I cannot conceive of its being of any value in otosclerosis. When we realize the pathologic condition that is present in otosclerosis, it is unlikely that any form of heat applied to the ear structures is going to be of any value in this condition.

Dr. Hilgartner has brought to our attention in a very conservative and logical way the value of diathermy, and, although we may possibly, from inexperience, disagree with him, the paper is certainly timely and will furnish food for serious thought by other members of this Section as it has been with me.

THE INTERPRETATION OF ABDOMINAL PAIN*

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Medicine is ever a growing science, and one of the prime objects of medical meetings should be to announce and elucidate new facts and discoveries of benefit to the profession. However, there is always old ground to be retraced, there are old ideas to be presented in different, and perhaps new forms. That the commoner conditions met in practice by the majority of physicians require a place on a general program is offered as an apology for another paper on abdominal pain. Although an authoritative dictionary now states that the origin of the word abdomen is uncertain, we still are willing to believe that abdomen is derived from the Latin word *abdere,* meaning to hide or to conceal. What mischief is afoot in this complex cavity is yet too often hidden from us.

Although the question of abdominal pain is always of particular concern to surgeons, of late internists have given the subject unusual and very careful attention. The matter was accorded exhaustive consideration at the last meeting of the Southern Medical Association by several of our leading internists and diagnosticians. Every surgeon will profit by reading the instructive papers of this symposium. Only one statement was made to which we take exception. A member, in his discussion, declared that "a great cause of failure in correctly determining the cause of abdominal pain is money." Such a grave charge as this should not be made without proofs, and no proofs have been produced. Errors in diagnosis are due to lack of knowledge and lack of care, and principally the latter. Remember the saying of Benjamin Franklin, "Want of care does more harm than want of knowledge," although in spite of both, mistakes will occur. I deny that money influences members of the medical profession in making diagnoses.

While the presence of other signs and symptoms usually is necessary in order to construct the completed picture of abdominal disease, pain generally is the chief guide to the surgeon that he is dealing with a surgical condition. Indeed, without the existence of pain in some form it is

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difficult to believe that the illness is such as to require surgical intervention.

It is not the purpose of the present paper to treat of the acute surgical abdomen as it is ordinarily encountered in our daily routine, although the last word about such cases can never be said on account of their infinite variety. We are here especially concerned with abdominal pain referred from disease elsewhere in the body, which was the chief topic of the recent symposium before this organization.

When the surgeon studies a patient with abdominal pain as an outstanding symptom, if not the outstanding symptom, he should view the case with an open frame of mind, because as Dewar has said, "Minds are like parachutes—they function only when open." In the majority of instances the experienced surgeon makes up his mind very soon as to whether or not the case is medical or surgical, and usually the differentiation is correct. The cause of intestinal obstruction may not be apparent until the abdomen is opened, but to know that obstruction exists is sufficient so that valuable time will not be wasted in administering useless enemata.

But there are problems in abdominal disease which will confound the most astute diagnostician. Abdominal pain ordinarily is due to abdominal disease, but exceptions are not uncommon, and seem to increase as our experience grows. Ignoring such exceptions leads to errors in diagnosis which may discredit surgery and the surgeon, and worst of all, do serious damage to the patient. Even the laity has become so informed today that frequently the patient inquires if the ulcer or the gallbladder which is about to be subjected to operation could be only nervous indigestion or an error in diet.

INFLUENCE OF ANATOMICAL RELATIONSHIP

Brown names three reasons why the digestive tract frequently is the area of referred symptoms: first, its close anatomical relationship to other viscera; second, the influence of the blood stream; and third, its unique nerve supply. While in a sense the first two reasons may hold good, in the final analysis it is through the nervous system that all referred symptoms are generated. The diaphragm, a thin membrane of muscle, is all that separates the heart, lungs and pleura from the stomach, liver and colon. Sometimes it is difficult to distinguish liver abscess from infection and fluid in the diaphragmatic pleura. An antero-posterior roentgenogram may not bring out the difference whereas a lateral view may do so by demonstrating the full curve of the diaphragm. The close anatomical relationship between the kidney and ureter and the colon and appendix often affords problems in differential diagnosis. Instances of a floating kidney twisted on its pedicle yielding the condition known as Dietl's crisis, which closely resembles an acute abdominal emergency, are familiar to everyone. I have seen a postcecal appendix which adhered to the ureter so as to produce ureteral obstruction and cause pus and blood to appear in the urine. The profession owes a deep debt of gratitude to Guy Hunner for his perseverance in showing the importance of thinking of ureteral stricture as the cause of abdominal pain. Many an appendix and many an ovary has been needlessly removed when ureteral dilatation would have effected a cure.

INFLUENCE OF THE BLOOD STREAM

As examples of referred abdominal pain traveling through the blood stream may be cited certain allergic conditions, and acute diseases like measles and lead poisoning, undulant and rheumatic fever, or, as in one of our cases, malarial fever. An interesting condition which falls under this head, and which rates newspaper publicity today, is arachnidism, caused by the bite of the black widow spider (*Latrodectus mactans*). The result may be such a clear picture of an acute abdominal lesion as to lead to an emergency laparotomy, of which there is more than one case on record. If there is a history of a bite the diagnosis should be established, but without such history the case is puzzling. Intense pain comes on immediately after the bite, first in the back and extremities, but soon in the abdomen, with board-like muscle rigidity, suggesting acute perforated peptic ulcer. The temperature does not rise higher than 100° F., but generally the leukocyte count registers 10,000 or 15,000, and 26,000 has been recorded. Usually nausea is absent and the pain is paroxysmal.[2] Recovery in a few days is the rule. But few fatalities have been reported. The spider's venom is highly potent, but fortunately it possesses only a limited amount. A physician friend of mine, living in the country, says that even morphine in half-grain doses has but little effect upon the pain of arachnidism. He says that a cupful of Epsom salts and a pint of whisky is the best treatment. I told him that if he would leave off the salts he would be over-

run with patients bitten by the black widow spider.

INFLUENCE OF THE NERVOUS SYSTEM

Apparently much effort has been expended in attempting to account for the action of the nervous system in referring pain to the abdomen from disease elsewhere in the body, but so far the explanations given are not illuminating to the average medical mind. Physiology teaches the relationship existing between the cerebrospinal and autonomic systems, but, as pointed out by Paullin,[3] there is yet much to be learned. It is understood that the intrinsic nerve supply of the digestive apparatus is unique in that it is derived from two sources: the sympathetic and the parasympathetic divisions of the autonomic system. This double nerve supply, antagonistic in action, is believed to be the principal cause of referred symptoms in the abdomen. No doubt, further research will help clarify this obscure subject.

Since the establishment of appendicitis as an entity one of the commonest examples of referred nerve action tending to mislead the physician in the interpretation of abdominal pain has been the error of pronouncing pneumonia or diaphragmatic pleurisy acute appendicitis, especially in children. The possibility of this blunder, however, has become so well fixed in our minds that the catastrophe is rarely encountered today, although in the early part of the present century it was not an infrequent occurrence. Nerve action of this kind, according to Mackenzie, Head and others is due to the fact that when afferent sensations such as pain travel from peripheral points, such as the lung or pleura, to the spinal cord, the sensation may be transmitted to some other part, such as the abdominal wall, a phenomenon which is ascribed to the close proximity of the central spinal cord segments which supply these parts through intercostal nerves. Why this action takes place in some cases, and not in all, is not known, but the fact that it may occur in certain instances is helpful in diagnosis.

HEAD'S LAW

It is recognized that sensory nerves are far keener in the somatic portions of the body, or the framework, than in the enclosed viscera, so that Head's law declares that "when a painful stimulus is applied to a part of low sensibility in close spinal cord connection with a part of much greater sensibility, the pain produced is felt in the part of higher sensibility rather than in the part of lower sensibility to which the stimulus is actually applied." Therefore it may be true that the pain thought to be located in abdominal viscera is not always in the part involved, but actually exists in the sensory nerves of the abdominal wall directly over the organ. An abdominal viscus and the abdominal wall directly over it have intimate spinal cord connection. This does not mean that viscera are entirely devoid of painful sensations, but that the painful reaction is less acute and is excited only by certain stimuli. The intestine, for example, may be subject to pain by distention or contraction, but not by cutting, burning or squeezing. This observation is made by the surgeon operating in the abdominal cavity under local anesthesia. He may cut or cauterize the gut at will without anesthesia, but pulling or dragging on it causes sickening pain.

Abdominal symptoms simulating almost any abdominal disease may result from some form of psychosis, seen so frequently in these days of stress and depression, but it is hardly conceivable that such a complex carefully considered would be so erroneously diagnosed as to suggest surgical treatment. However, we have all seen the imitation of diseases of the digestive tract by lesions of the central nervous system lead to the consideration of surgical interference. For many decades it has been recognized that the pain of the gastric crises of tabes might be misjudged as an indication of peptic ulcer or bile tract disease. It should not be forgotten that these entities may coexist.

MIMICRY BY HERPES ZOSTER

The early recognition of herpes zoster involving spinal nerves may perplex the diagnostician. Before the appearance of the characteristic rash, which may require as long as four days from the onset of the illness, the pain and nausea, vomiting, fever and leukocytosis which possibly may be present, may cause the case to be considered one of pleurisy, gallstones or kidney colic, or appendicitis. Ordinarily the pain and other symptoms are not sufficiently marked to suggest an intra-abdominal lesion, but I saw a young man who had rather sudden severe pain over McBurney's point, followed by nausea, vomiting, fever, leukocytes of 15,000, and later tenderness and muscle spasm. The temperature of 104° F. was so out of proportion to the rest of the set-up that operation for appendicitis was delayed long enough to allow the eruption of a fine crop of blisters in the right iliac fossa. It is remarkable that most books on dermatology have but

little to say concerning the possibility of confusing herpes zoster with acute abdominal disease, the reason therefore probably being that dermatologists rarely see such cases until after the appearance of the tell-tale eruption.

It is only in the comparatively common disease, herpes zoster, that I can agree with the late Dr. J. B. Carnett[4] that any appreciable number of cases of abdominal pain is due to affections of the intercostal nerves. This author wrote voluminously on the subject, and is one of those who called chronic appendicitis a myth. He named it pseudo-appendicitis and believed that the associated pain and tenderness in such cases were due to intercostal neuralgia caused by an undefined "toxemia." Carnett based the diagnosis on his method of examining the abdomen, which he described as follows:

"The test for demonstrating parietal tenderness consists of palpation during a period in which the patient holds his anterior abdominal muscles as tense as possible. The tense abdominal muscles prevent the examiner's fingers from coming in contact with the underlying viscera, and any tenderness that is elicited over them will be located in the abdominal wall. The routine application of the preceding test properly carried out in all cases exhibiting abdominal tenderness brings out the astonishing fact that tenderness is encountered in the abdominal wall more frequently than in the abdomen."

From Head's law, quoted above, it does not appear that tenderness in the abdominal wall rather than in the abdominal cavity rules out the existence of inflammation in the appendix or other abdominal viscera. The appendix is a part of low sensibility, whereas the abdominal wall is a part of high sensibility. The appendix and the abdominal wall over it being centrally connected in the same or adjacent segments of the spinal cord, the pain in the inflamed appendix is transferred to the highly sensitive nerves of the abdominal wall, which accordingly is tender on pressure.

Tumors of the spinal cord and diseases of the vertebrae may refer pain to the anterior abdominal wall, which thorough investigation should reveal. The recent flood of operations on the phrenic nerve is leaving in its wake pain in the region of the diaphragm and right shoulder, directing attention to the stomach or gallbladder as the seat of disease.

HEART AND GALLBLADDER

Differentiation between cardiac and gallbladder disease frequently is difficult, and certainly is vital, especially from the standpoint of treatment. Vest[5] states that "the rank and file of the profession realize neither the significance of the relationship nor the necessity for thorough study and evaluation of both organs when either presents symptoms." Angina pectoris and gallbladder disease may coexist, or an infected gallbladder may bring on anginoid attacks. Mackenzie tells us that, from John Hunter's description of his own case, this famous man's supposed seizures of angina at first were typical gallstone attacks, but later became true angina. At autopsy coronary sclerosis was found, as the none less celebrated Edward Joiner had diagnosed, and gallstones were present as well. Anginal attacks dependent upon cholecystic disease occur in less than 1 per cent of all pathological gallbladders. Pain with fairly typical radiation is the commonest of the major symptoms, and fear of death often is present. But the sensation of constriction is exceedingly rare in false angina, or the anginoid type, and this is a most important distinguishing sign between this type and true angina. Electrocardiograms and cholecystograms may aid in differential diagnosis.

Just how an infected gallbladder excites heart attacks is not understood. According to Vest, some investigators have advanced the theory that the presence in the circulating blood of an increase of bile salts and bile pigment may be responsible, or that the infected gallbladder acts as a focus for the elaboration of bacterial toxins which affect the heart. Only a few observers claim that the anginoid pain is produced by actual inflammation or by the expulsive efforts made to get rid of a stone or mucous plug; most are agreed that the pain represents biliary colic with the sensation radiated precordially along the usual anginal paths. The mechanism of the radiation is explained by the innervation of the heart and the gallbladder through their mutual complicated connections with the vagus and the autonomic system. Heart attacks due to gallbladder disease may at times be analogous to similar attacks brought on by hyperthyroidism. Cholecystectomy or total thyroidectomy may relieve the symptoms.

Finally, seizures of angina pectoris or coronary occlusion may cause violent abdominal pain thought to be something else besides gallbladder disease, such as pancreatitis or perforated peptic ulcer. In such heart attacks pain may be very pronounced before nausea and vomiting occur. Often the leukocyte count is as high as 20,000, with polymorphonuclears predominating, as in acute abdominal disease.

Time and space do not permit mention of all the recorded cases of extra-abdominal conditions

producing abdominal pain. Their number is legion, and their remoteness from the abdomen may be as far as flat feet. The likelihood of the occurrence of such diagnostic problems emphasizes the importance of the collaboration of physician and surgeon in the study of such cases.

ILLUSTRATIVE CASES SUMMARIZED

Case 1.—A white man, aged 32, came from out of town with the diagnosis of duodenal ulcer, with the request that he be operated upon the next day. He gave a rather typical history of ulcer; stated that he had had indigestion for the past fifteen years, but that it had been much worse for the past five years. He complained of a gnawing pain in the upper abdomen which came on from fifteen to thirty minutes after eating, and which was relieved by soda or food. There was no history of vomiting or hemorrhage. He had been on a strict milk diet for several days, and had grown very weak, having lost thirty pounds in the past three months. Physical examination was essentially negative except that the patient was somewhat tender in the epigastrium. Routine examination of the urine a few hours after admission reported specific gravity 1.020, acid, no albumin, sugar four plus, acetone four plus, diacetic acid two plus, no casts, pus or blood. It was then ascertained that the young man was drinking from five to six pints of water per day and eliminating a few ounces more. Blood sugar was 266 mg.; Wassermann and Kahn reactions were negative. He brought with him a roentgen film which was indefinite as to ulcer, and it was reported from his home town that his urine had failed to show sugar. He was placed on a full diet, with from 10 to 15 units of insulin before each meal and evidenced an enormous appetite. Strength and weight returned rapidly. A roentgen film showed possible duodenitis, which might be considered a sequel of diabetes, or, as has been suggested, pancreatitis might have been present. The patient's pain disappeared upon treatment for diabetes.

Case 2.—A negro man a house painter, aged 38, during the eight months before admission to the hospital had four attacks of abdominal cramps, each lasting about fifteen minutes, and apparently relieved by salts and soda. Each attack grew worse and the present attack was so severe that he was brought to the hospital immediately. On admission his pulse was 110, respirations were 36, and temperature was 101°; leukocytes were 15,350 and polymorphonuclears 79 per cent. The abdomen was somewhat distended, but there was no spasm, and no masses were felt. Abdominal pain continued for eight hours after he entered the hospital. The admitting officer had made a provisional diagnosis of appendicitis, but this was disregarded on considering the patient's occupation and examining his mouth, which showed marked pyorrhea, a blue line on the lower gums, and bluish discoloration of the mucous membrane. The red blood corpuscles revealed stippling. The diagnosis was acute lead poisoning. On a high calcium diet (milk) the patient soon improved and left the hospital.

Case 3.—The next patient is reported through the courtesy of Dr. J. E. Paullin. She was an unmarried woman, aged 24. Until fifteen months before she had been in good health, when she had a sudden attack of acute abdominal pain and subsequently had ten or twelve such attacks. The seizures began with cold hands, followed by mild pain in the epigastrium, which gradually increased in severity, lasting two or three hours or longer, and requiring morphia for relief. Finally the pain became violent and cramp-like. The pain did not radiate and there was no nausea or vomiting. There was a board-like abdomen, but no elevation in temperature or pulse rate and no leukocytosis. The attacks usually came at night, wakening the young woman from a sound sleep. In several instances gastric lavage was administered, but without mitigating her suffering. When in pain she was restless, moving about in bed, but change in position made her feel no better. Usually morphia one-half grain was necessary, and once morphia one and a half grains had to be given. After an attack an urticarial rash appeared on the face and sometimes on the arms and legs. All physical, laboratory and roentgen examinations did not help solve this case, but when the patient was tested for probable food idiosyncrasy she was found to be hypersensitive to bananas. It was then ascertained that all the attacks came on from two to five hours after eating a banana, so the diagnosis was food allergy. After bananas were eliminated from the diet, the attacks ceased.

Case 4.—A negro man, aged 22, was admitted to the hospital suffering with violent abdominal pain. Three hours previously, while he was driving a truck, a black spider appeared on his shirt front. He knocked the insect off and did not think it bit him. Immediately, however, he began to have severe pain around the navel. On admission abdominal pain was general, especially severe in the flanks. For the previous two months he had been having irregular attacks of cramping abdominal pain, without special reference to food or meals. A week previously he spit up some blood, but thought it came from his teeth. There was no nausea or vomiting; his pulse was 140, respiratory rate 28, and temperature 98°. His chest was clear; rectum and urine were negative, and later a Wassermann proved to be negative. The first leukocyte count was 13,800, with polymorphonuclears 80 per cent; later counts were 16,400 and 18,400, and the temperature rose to 100°. Blood pressure was 164-80. The patient had been given morphia one-fourth grain before entering the hospital, apparently without any relief. Gastric lavage failed to bring any blood. His suffering was intense, but the most striking feature of the case was the rigidity of the abdomen, which was as marked as was ever seen in any condition by anyone present. On this account, and because of the history and physical findings, such diagnoses were ventured as acute appendicitis, ruptured peptic ulcer, acute pancreatitis and mesenteric thrombosis. Because of the history of possible spider bite, laparotomy was deferred, more morphia administered, stupes applied to the abdomen, and in forty-eight hours the pain and other symptoms had disappeared. Two days later the patient was dismissed as well. The resident surgeon afterwards said that he thought this "negro should be opened up," but he was afraid to do it because he thought the patient was too sick to stand an operation.

REFERENCES

1. Brown, Thomas R.: Some Notes on Referred Digestive Symptoms. Sou. Med. Jour., **27**:481-486, June, 1934.
2. Noland, Lloyd: Arachnidism. Trans. Sou. Surg. Assn., 1932.
3. Paullin, James E.: Symptoms and Signs Referred to the Appendix and Intestine: The Result of Disorders Elsewhere. Sou. Med. Jour., **27**:331-335, April. 1934.
4. Carnett, J. B.: Chronic Pseudo-appendicitis Due to Intercostal Neuralgia. Amer. Jour. Med. Sci., **174**:579-599, 1927.
5. Vest, Walter E.: Anginoid Symptoms of Gallbladder Disease. Sou. Med. Jour., **27**: 1934.

THE DIAGNOSIS AND TREATMENT OF DUODENAL ULCER*

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The subject of duodenal ulcer, after all that has been said and written about it, still presents many problems for discussion, upon which those interested in their solution are not in complete accord. That this is not due to lack of opportunity for observation is evidenced by the fact that the incidence of duodenal ulcer is estimated at about 8 per cent of the population. If the final solution of the problem could be compassed by the surgical removal of the ulcer and this could be done with relative safety the chapter upon indications for treatment could be closed. Unfortunately, this is not the case: the situation of many ulcers is such that direct attack upon them is fraught with danger; furthermore, which is more important, the ulcer is a local expression of an obscure and as yet incompletely understood etiologic factor, as a result of which recurrence after any and all forms of treatment are noted. Experience has shown that with the formation of a duodenal ulcer its possessor becomes a potential ulcer patient for life. Out of the mass of experience accumulated during the past 25 years certain observations stand out rather prominently. These are:

(1) The problems presented by duodenal ulcer are not to be relegated to any one field of practice, the services of the internist, the surgeon, the pathologist, the research worker and the roentgenologist being required for their solution.

(2) The treatment of duodenal ulcer is primarily medical.

(3) The importance of a correct diagnosis at an early stage of the disease with the institution of appropriate treatment is paramount.

(4) The employment of surgery should be reserved for the treatment of its complications and the correction of its sequelae, together with direct attack upon those ulcers which prove intractable to an intelligently planned, well carried-out medical regime.

(5) The successful treatment of duodenal ulcer in all of its phases implies the joint employment of both medical and surgical measures since the lesion, in the absence of accurate knowledge of the true underlying causative factors, must be dealt with according to the clinical and pathological features presented by the individual case.

The progressive pathologic changes seen in the course of duodenal ulcer are: variations in depth and extent of ulceration from those that are superficial to those that penetrate and perforate the intestinal wall; diversity of location and difference in number; thick, calloused bases with scar tissue; sealed perforation with adherence to adjacent tissue or organs, especially the pancreas; fixation of the duodenum and pylorus due to inflammatory exudate, recent or fibrous; exudative massive adhesions; and obstruction of the duodenum due to cicatrical contraction, with consequent abnormally long gastric retention of food. When one visualizes these structural defects and realizes that, for the most part, they have their origin in what primarily is a simple ulcer, the importance of a correct diagnosis early in the disease becomes apparent. This is to be determined by an appraisal of the patient's history supplemented by adequate laboratory study. In many instances the history of symptoms recited by the patient corresponds to the classical picture: hunger pain, with food ease; fullness, discomfort, and sour eructations coming after an appreciable interval following the ingestion of food; seasonal variations; hemorrhage in the shape of tarry stools or the vomiting of blood; night pain, relieved by milk or food; with the supervention of pyloric obstruction, spastic or structural, vomiting of food and gastric secretion. When such a recital is obtained analysis of the gastric contents but reveals the hyperacidity and x-ray study, the constant deformity of the duodenal cap which one confidently feels to exist.

But not all cases give such a typical history; the constancy or fixity of symptoms may be lacking or the symptoms may be of such mild character as to delude both the patient and the physician; the periods of remission may be long and the evidence of activity of short duration, often leading to the erroneous conclusion that the digestive disturbance is due to a dietary indiscretion; pain, as such, may not exist; if present it may be mild, or when the ulceration extends deeply into the wall of the gut or has penetrated into surrounding structures, may be acute and severe.

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With an appreciation that all duodenal ulcers cannot be recognized upon clinical history alone, and that the possibility of ulcer cannot be excluded by the mildness of the discomfort described, every dyspeptic should be given the benefit of a careful study. This should include an accurate history of symptoms and complaints, a thorough physical examination, analysis of the blood, urine and gastric contents with roentgenological determination, both fluoroscopic and film, of the gastro-intestinal tract. This requires time and effort, but one is rewarded in being able to treat intelligently the multitude of patients whose chief complaint is "stomach trouble." Not everyone will be proved to have duodenal ulcer. In order to obtain concrete evidence for discussion the histories of 200 patients coming under our observation over a period of two years giving "stomach trouble" or dyspepsia as their chief complaint were studied, and but 18, or 9 per cent, found to have duodenal ulcer. Eight presented lesions of the stomach, while in the remaining 174 the cause of the dyspepsia was located outside the stomach and duodenum. Granting the diagnosis of duodenal ulcer, appropriate treatment becomes the next consideration. In the absence of complications and of the sequelae dependent on long continued disease the treatment is primarily medical.

Many theories as to the primary cause of ulcer have been advanced, but so far none has been susceptible of scientific substantiation. There is agreement that the digestive action of the gastric juice is the secondary essential factor, but much divergence of opinion exists as to the factors which damage the mucosa to the extent that its digestion by the gastric juice occurs. Peptic ulcers occur only in mucosa exposed to the action of gastric juice containing free hydrochloric acid and pepsin, and the tendency to chronicity exhibited by them is to be attributed to its corrosive action. The pain of ulcer bears a direct relationship to the presence of free hydrochloric acid. The most important point in the scientific medical treatment of duodenal ulcer is the adoption of a regime that will insure the raw surface of the ulcer freedom from the corrosive effect of the gastric juice by maintaining an absence of the free hydrochloric acid which is essential to the digestive action of the pepsin. As you well know, this neutralization is accomplished by diet and antacid medication. Observation and experience has long shown the worth of the protein of milk both as a food and as an antacid, while the alkalies and some of the newer medicaments, such as mucin, have demonstrated their value as neutralizing agents. Care must be observed in the selection and administration of alkalies to avoid disturbing the acid-base ratio with the production of an alkalosis. A definite routine in the timing of taking food and alkalies must be followed to obtain and maintain absence of free hydrochloric acid and thus bring about conditions favorable for ulcer healing. Rest from overwork, freedom from worry, adequate sleep, regulation of habits of eating, of using alcohol and tobacco, and the elimination of foci of infection, are further essentials to a proper medical regime. Medical treatment, to be effective, must be systematically carried out over a long period; the concensus of opinion among those proficient in its application sets the minimum at five to six months. Unfortunately, in a certain percentage of "cures" recurrence is noted after a lapse of months or years, due in some instances to the breaking down of more or less avascular scars resulting from the healing of large ulcers, in others to those unknown factors which combine to give to the patient ulcer-bearing qualities.

The patients with duodenal ulcers that we have selected for operation have presented one or more of four conditions: perforation, repeated or long continued hemorrhage, pyloric obstruction and intractable chronicity. Approximately 80 per cent of the acute perforations of duodenal ulcers occur on the anterior and superior walls and immediate closure is the essential indication. Superimposed layers of Lembert sutures and an omental fat graft suffice not only to control leakage but in a goodly percentage to secure healing of the ulcer, as well. The employment of additional measures such as excision or cauterization of the ulcer, pyloroplasty, gastroenterostomy or resection will depend upon the extent, character and location of the local lesion and the general condition of the patient. The prime consideration in such catastrophes is the saving of life. This is accomplished by the stoppage of the leak. It may be stated as a general rule that the greatest safety to the greatest number prohibits doing more, yet in the presence of marked pyloric or duodenal obstruction, granting that the condition of the patient permits, a pyloroplasty or gastro-enterostomy may be done with reasonable safety, giving some assurance of permanent relief and obviating a

second operation. Perforations in which more or less successful efforts at closure have been made by nature will present in three clinical groups: (1) rather extensive epigastric peritonitis with subhepatic or subphrenic abscess; (2) localized peritonitis with recent inflammatory exudate matting together structures adjacent to the perforation; and (3) chronic perforations in which the inflammatory phenomena have disappeared, and the perforations remain sealed by close adherence of contiguous structures. In the first two groups the perforation itself, surrounded and sealed by acutely inflamed tissues, will neither demand attention nor permit surgical attack, the operative treatment consisting, in the first group, of drainage of the purulent deposits, and in the second of gastro-enterostomy. In the third group the location of the ulcer and the structures to which it is adhered will determine the nature and extent of the operation.

Hemorrhage in duodenal ulcers occurs in about 20 per cent of all cases, appearing usually in one of three forms: more or less constant seepage sufficient to produce anemia, single or recurring hemorrhages of appreciable amount as melena of hematemesis and massive bleeding which immediately threatens the life of the patient. Ulcers that show constant seepage or recurrent bleeding of appreciable amount, in spite of appropriate medical treatment, should be subjected to operation. The type of operation employed should include the destruction of the ulcer, since such ulcers when treated by conservative operations which do not include their eradication show in many instances a definite tendency to further bleeding. A single massive hemorrhage is not regarded as an indication for operation. The treatment we have employed consists of rest in bed, physiologic rest of the stomach, fluids and nutrition in the form of glucose administered by rectum, subcutaneously and intravenously, the exhibition of coagulants, and whole blood transfusions. The fluids introduced intravenously should be in small amounts, glucose in hypertonic solution, and blood transfusions of 200 to 300 c. c., since the employment of larger quantities raises the blood pressure and so tends to induce further bleeding. Under this regime the bleeding, as a rule, will cease, permitting further study of the patient and a determination for or against operation upon the associated symptoms, history and laboratory findings. Rarely a case will be met in which such measures fail when the control of bleeding becomes an indication for operation.

Intractable chronicity in spite of appropriate medical treatment is accepted as a failure of the latter, and an indication for operation. For some unexplained reason duodenal ulcers do not show a tendency to maligant degeneration, hence it has been argued that chronicity alone does not justify resort to operation. The danger of perforation, the menace of hemorrhage, the possibility of obstruction, and the continued discomfort produced by the chronic ulcer afford sufficient grounds to negate this assumption. The wide variation in the degree and character of the pathology encountered in duodenal ulcer is such that no single operation suffices to meet the indications in all cases. The attainment of success in its surgical treatment is largely dependent upon three factors: selection of cases for operation, choice of operation and efficient pre- and postoperative medical management. Excision of the ulcer with a portion of the pyloric sphincter by means of a Finney or modified Mickulicz pyloroplasty has been employed for ulcers situated other than on the posterior wall and in which the pylorus and duodenum could be readily mobilized so as to afford access for the necessary manipulations. In the cases conforming to these limitations it has proven a satisfactory procedure, preventing pylorospasm, affording adequate stomach drainage and permitting regurgitation of duodenal contents into the stomach for neutralization of the acid gastric juice. With increasing experience gastro-enterostomy has been less frequently employed alone in the treatment of duodenal ulcer.

The destruction of the ulcer is not an imperative indication, but when local conditions make this a feasible and reasonably safe procedure it is advisable, in that it at once gets rid of the ulcer, avoiding dependence on a slow-healing process and obviating the possibility of subsequent bleeding and perforation. The eradication of the ulcer is preferably accomplished with the cautery after the method of Balfour, in that the bleeding and operative trauma are decidedly less and the destruction of the ulcer just as certain. The cautery wound is closed with Lembert sutures and covered with an omental fat graft, after which a posterior gastro-enterostomy is done. These two conservative procedures, pyloroplasty with excision of the ulcer and gastro-enterostomy with destruction

of the ulcer, will meet the indications in the majority of duodenal ulcers, and the excellent results obtained place the burden of proof upon the advocates of other methods to show just cause for such advocacy. On the hypothesis that where there is no acid there will be no ulcer Finsterer and his followers have practiced the ablation of the acid-bearing portion of the stomach, regardless of whether the ulcer be duodenal or gastric, with the avowed intention of producing anacidity. We have had no experience with such massive resections in the treatment of duodenal ulcer, believing the magnitude and extent of the operation to be prohibitive when compared with the favorable results obtained by simpler and less dangerous procedures. Furthermore, the presence of hydrochloric acid is essential for the physiology of digestion and its continued absence, howsoever produced, may be the forerunner of serious secondary disease.

In the presence of obstruction due to cicatrization in the duodenum and pylorus, gastro-enterostomy alone affords beneficent results; the greater the obstruction the more certain and more complete the relief. When the ulcers are multiple, and they are in about 5 per cent of cases; when situated on the posterior wall, difficult of access and so calloused as to render healing difficult; and when so situated that the ulcer has perforated into the head of the pancreas with fixation of the duodenum and pylorus to the latter organ, we have come to the practice of resection of the duodenum and pylorus. Such ulcers do not lend themselves to cautery destruction or excision with pyloroplasty. Our experience with gastro-enterostomy alone in such cases has been disappointing, in that persistence of epigastric discomfort, recurrence of bleeding, and the incidence of pancreatitis and pancreatic malignancy have been noted. It is true that such a radical operation carries a graver operative risk, but this is justified by the greater assurance of relief. As with medical cures, duodenal ulcer may recur after any type of operation, being situated at the former suture line, in new locations and in the jejunum at or below the site of anastomosis with the stomach, the cause for their formation being as elusive as that for their primary appearance. Among the known causes for failure in the surgical treatment may be mentioned the improper selection of patients for operation; faulty judgment in the choice of operation; failure to exercise proper and prolonged postoperative dietary and medical supervision; faulty technic; leaving behind an infected gallbladder or diseased appendix; overlooking distant foci of infection; and, finally, it should be borne in mind that in the great majority of patients presenting gastric symptoms the latter are due to causes extrinsic to the stomach and duodenum. Granting the coincidental occurrence of duodenal ulcer in such a patient, its medical cure or operative correction is doomed to complete or partial failure so far as securing complete freedom from symptoms is concerned, unless the extra duodenal causes of dyspepsia can be eliminated.

THE FACTORS THAT MAINTAIN THE HIGH DEATH RATE IN ACUTE APPENDICITIS*

By Jno. H. Blackburn, M.D., F.A.C.S.,
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Much has been written along this line in the last few years, and for the year ending June 30, 1934, there were listed in the Index Medicus 501 papers on appendicitis, and 18 dealing especially with the mortality of appendicitis. However, we feel that our temerity in bringing such a shopworn topic to you has been somewhat justified when we note in the preliminary program of this great meeting that today there are five papers on appendicitis, three of them dealing particularly with the mortality rate and its causes. Let us hope that the fruits of these efforts may be apparent in the mortality tables of the states of Texas, Arkansas, Tennessee, and Kentucky in the next decade.

Increase in Appendicitis. — Unquestionably there has been an increase in the incidence of appendicitis as shown by the U. S. Census Bureau, the death rate for the Registration Area in the United States being as follows:

1900	9.7 per hundred thousand
1905	11.5
1910	12.5
1920	13.4, 11,702 deaths
1925	15.2, 15,618 deaths
1929	15.2, 17,687 deaths

To deal specifically with the state of Ken-

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tucky and the city of Louisville, the figures for deaths from appendicitis are as follows:

	Kentucky	Louisville
1920	199	35
1925	312	72
1929	337	68
1933	333	

According to the Metropolitan Life tables for one year and over the death rate per hundred thousand is as follows:

1911	10.9
1916	12.3
1921	13.9
1926	13.4
1931	14.3

In spite of the efforts of certain statisticians to give us "corrected statistics" showing only an apparent increase we believe there is a real increase in the disease.

In a discussion of the different factors that influence the death rate in appendicitis we shall quote from our own series of 661 cases, 357 of which were classified as acute appendicitis.

Age.—In our cases the incidence as to decades and the death rate was as follows:

Age in Years	Cases	Deaths	Per Cent
1 to 10	22	2	9.0
11 to 20	208	4	1.9
21 to 30	225	2	0.88
31 to 40	114	3	2.6
41 to 50	65	1	1.5
51 to 60	16	1	6.2
Over 60	11	4	36.4
Total	661	17	2.55

These figures correspond closely to several other reported series. The mortality of the first decade is explained on the basis of the lack of resistance of the child and the difficulties of diagnosis during this decade, as well as the tendency to give purgatives in childhood. At the recent meeting of the Kentucky State Medical Association a surgeon presented the difficulties incident to an accurate diagnosis in the first decade and warned against delay in abdominal cases, and the pediatrician, in the discussion, warned us that in the first decade 85 per cent of the cases of abdominal pain were due to other conditions than the appendix and that correction in diet was the chief indication. As to the death rate in the fifth, sixth and seventh decades our figures follow closely those of other reports and warn us of the increasing danger in delay at this time of life. Maes and his co-workers have recently presented a very comprehensive paper, a clinical reiew of 100 cases of "acute appendicitis after forty," explaining the higher death rate in the older patients on a pathological basis. In the young patients, they say, the appendix is largely a lymphoid organ, while in older individuals it is a vascular structure.

"In the young subject the disease tends to localize; in the older subject it tends to spread, so that in one we may hope for a localized abscess; in the other we must expect a spreading or general infection. Moreover, in the older subject, because of the predominance of the vascular factor, the infection often goes on to an associated mesenteric thrombosis or pyelophlebitis, or even to the metastatic abscess of the liver first described by Dieulafoy under the name of the 'appendicular liver.'"

Recognizing the fact that the two extremes of life carry a definitely higher death rate in appendicitis, we may be able to give a more accurate prognosis in these cases, but childhood and old age are factors that may not be controlled in any series of cases, although our knowledge of these facts should reduce to a minimum the unnecessary mortality dependent upon delay, purgatives, et cetera.

Pathology.—In our series 357 cases were classified as acute appendicitis. Under the term "acute suppurative" were placed those cases with purulent contents in the appendix or with a definite abscess, and with a localized involvement of the peritoneum; of these there were 267 cases, with four deaths, 1.5 per cent. As "gangrenous appendicitis" were classified, those having a greater or less macroscopic involvement of the mucosa or of all the layers of the wall of the appendix; of those there were 32 cases, with one death, 3.1 per cent. Under the term "ruptured" were placed those with a definite "spreading" peritonitis, not always generalized, however. Of these there were 58 cases with 12 deaths, 20.7 per cent; to reiterate "acute suppurative," 1.5 per cent mortality; "gangrenous," 3.1 per cent, and "ruptured," 20.7 per cent. In a total of 357 cases of acute appendicitis there were 17 deaths, 4.8 per cent.

It is commonplace to remark that an individual never dies of appendicitis, but of the complications or sequelae. However trite the saying, it is still a pathological fact, and the reduction in mortality is to be found in the prevention of the development of these complications, especially peritonitis, by early operation.

Delay.—If there is any one established fact in the mind of the experienced surgeon it is that

there is a direct and definite relation in the length of time from the onset of the attack to the time of operation. There is a rapidly increasing mortality up to about the seventh day, after which it gradually declines. Boland has shown this in detail in his analysis of 3,513 cases in the hospitals of Atlanta for a period of five years. The time interval from onset of symptoms to operation, and the accompanying death rate was as follows:

Hours Since Onset	Mortality Per Cent
1 to 6, 219 cases, no deaths	.0
6 to 12, 578 cases, 6 deaths	1.
13 to 18, 204 cases, 2 deaths	1.
19 to 24, 826 cases, 22 deaths	2.6
25 to 36, 178 cases, 22 deaths	12.3
37 to 48, 595 cases, 28 deaths	5.
49 to 72, 335 cases, 22 deaths	6.5
More than 72, 578 cases, 48 deaths	8.

In an analysis of 14,904 cases of acute appendicitis in 28 hospitals in Philadelphia, 1928 to 1932, inclusive, Bower found almost the same mortality rate, the death rate increasing in direct proportion to the length of time from onset. He found that in the first 24 hours there were 96 deaths, 2.06 per cent mortality; in the second 24 hours, 249 deaths, 4.88 per cent; third 24 hours, 131 deaths, 6.67 per cent; after 72 hours 239 deaths, 9.7 per cent. In the total series, 14,904 cases, there were 715 deaths, 4.79 per cent.

We would cite here a series of 256 cases of acute appendicitis operated upon in 10 months at the Base Hospital at Camp Logan, Houston, Texas, during the World War. Military rule prevailed, there was no delay, no purgatives were given, and there were no deaths. Quite recently Stanton has presented a study of 1,004 cases of acute appendicitis extending over a period of 26 years in which he correlates the time of operation, the pathology and the mortality. During the first period, 1907-1914, there were 116 cases with 8 deaths, 6.9 per cent; in the next, 1915-1923, there were 380 cases with 21 deaths, 5.5 per cent; in the third period, 1924-1933, there were 508 cases with 11 deaths, 2.16 per cent. Stanton had observed during the first two periods that the highest mortality occurred in cases operated upon on the fourth to the sixth or seventh day, and during the last period he adopted the sensible rule of delaying for a few days those cases coming in in the midst of the danger zone. A further explanation of his reduced mortality in the last period was found in the increasingly larger number of cases referred to him in the first or second 24 hours. Unquestionably, delay is a marked factor in an increasing death rate, and it is the one factor that the surgeon may prevent by educating his medical confreres and his patients as to the danger incident to delay. Experience has shown that he does not have to assume the attitude of "do or die," but that a clear sensible explanation of conditions and possibilities will ordinarily prevent the dangerous delay.

Purgatives.—The most comprehensive study of the relation of purgatives to mortality in appendicitis has been that of Bower in his review of cases in Philadelphia. During 1928-'29 there were 5,121 cases, with 306 deaths. When the case histories were studied it was found that there were 147 deaths in the cases in which laxatives had been given, while in those in which no laxative was given there were only 13 deaths. There were an additional 146 cases in which the case history did not mention laxatives. If the same ratio existed in these cases as in those mentioning the laxatives there were in the series 280 deaths in cases receiving laxatives to 26 who did not have them.

In the second Philadelphia series reported by Bower, 1930-'31-'32, there were 1,305 cases in which no laxatives were given, with 12 deaths, or one in 109 died. In a series of 3,293 cases in which one or more laxatives were given there were 202 deaths; one in 16 died. A further study showed that where only one laxative was given, one in 18 died, while in the cases given multiple laxatives one in 10 died.

Without a doubt there is a direct causal relationship between the administration of laxatives and the death rate in acute appendicitis. This is the one factor which may be best controlled by the education of the public and the plan used by Bower and his committee in Philadelphia may well be followed in securing the help of all available influences such as the druggists, high school pupils, parent-teacher associations, and so on.

Opiates.—It is doubtless a matter of supererogation to mention the use of opiates in cases

of acute appendicitis and yet in any discussion of this subject in the ordinary county, district or state medical society we shall find one or more medical men whose rule is to give a hypodermic and wait and see what the result will be tomorrow or next day. And every one of them can cite one or more cases that "recovered without operation and have been well ever since." On the other hand, most of the cases which we have seen which have had a rupture after the administration of morphine, failed to recognize it until peritonitis was well established, because of the masking of the significant symptoms.

CONCLUSIONS

Undoubtedly there has been a definite increase in the total number of cases of acute appendicitis, as well as a relative increase in incidence.

Age as a factor is not controllable, but at the extremes of life we should be more alert as to diagnosis in order that the other factor of delay may not enter.

The pathology of the appendix in acute inflammation is a variable condition, dependent upon whether the blood or lymph vessels be primarily involved, upon the type of infecting organism, upon the length of time, and so on. The operative risk is certainly less in the first day, and the ultimate outcome in any case cannot always be determined from the symptoms, physical examination, and laboratory findings. Operate early if conditions are at all favorable.

Delay is one factor that may be controlled by educating the public, as well as our medical brethren.

The use of laxatives in abdominal disorders is so well established by custom that much time and patience will be required to relieve the public of the purgative habit, and we should use all means to educate our clientele as to the danger of laxatives and delay in any abdominal pain that lasts longer than six hours.

REFERENCES

Boland, F. K.: J.A.M.A., **99**:443, 1932.
Bower, J. O.: J.A.M.A., **96**:1461, 1932.
J.A.M.A., **102**:813, 1934.
Maes, U.; Boyce, F.; and McFetridge, E. M.: Amer. Jour. Surg., New Series, **23**:157, Jan., 1934.

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NINE YEARS' EXPERIENCE WITH GALLBLADDER VISUALIZATION*

By DAVIS SPANGLER, M.D.,
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When Graham and Cole[1] announced their discovery of a phthalein compound which, when given orally or intravenously, would visualize the gallbladder, they closed a great gap in gastro-intestinal radiographic diagnosis. Previously the diagnosis of the diseased gallbladder rested on purely presumptive evidence, or was reached by the process of eliminating all other causes of digestive distress. Any rounded shadow in the upper right abdominal quadrant, which could not be identified as another organ, was taken to be a diseased gallbladder, and the finding of a nest of gallstone shadows was a cause for rejoicing. With the announcement of gallbladder visualization this picture changed. We were now able to give some definite positive information to the surgeon and clinician. The radiological diagnosis of gallbladder disease changed from a guessing contest to a standardized procedure of proven worth and accuracy.

Since 1925 there have been 714 traceable cases of gallbladder visualization in our clinic. Usually the dye was given by the oral method; only 63 patients were examined after intravenous injection. Thirty-four of the 714 patients received more than one test. We have had the usual percentage of nausea and diarrhea, with occasional vomiting in the oral cases, but with no severe reactions. Since 1931 we have had no severe, and only an occasional uncomfortable reaction with the intravenous method. The credit for the elimination of intravenous reactions goes to Dr. Fred T. Rogers, of our staff. He has insisted that the following simple precautions be carefully followed.

(1) All tubing and glassware are thoroughly boiled in soda solution and are carefully cleaned afterward, both within and without, with distilled water.

(2) All water used in the salt and dye solutions is doubly distilled over lime.

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*From the Department of Radiology, Dallas Medical and Surgical Clinic.

(3) The dye solution must not be more than 24 hours old.

(4) Not less than 15 minutes are consumed in the actual injection of the dye, preceded and followed by normal saline solution.

(5) The median basilic vein is used, if possible. All solutions must be as nearly body temperature as possible.

(6) At conclusion of the injection, to prevent phlebitis, no pressure is made over the puncture, but the arm is kept elevated for some minutes.

I have divided my 714 cases into the following groups: (1) gallstones; (2) gallbladder not filled, presumably diseased; (3) gallbladder filled, diseased; (4) gallbladder, normal. An x-ray diagnosis of gallstones was made in 65 patients from June, 1925, to August, 1934. There were 29 surgical patients in which the x-ray diagnosis was confirmed by surgical operation and by a pathologist. There were eight cases in which the gallbladder was reported as non-filling with undetected stones, in which stones were found at operation. There were 36 medical patients in which the x-ray diagnosis was confirmed by medical history and examinations. There were no cases in this series in which the clinical findings disagreed with the positive x-ray diagnosis of gallstones. There were 118 cases in which the x-ray diagnosis was made of "gallbladder not filled, presumably diseased." In this group 25 had surgical operations, 23 had pathological gallbladders (92 per cent agreement). In two cases pelvic disease was found and normal gallbladders were reported by the surgeon. There were 93 patients in this group who had no surgical treatment. The medical diagnosis agreed with the x-ray diagnosis in 89 cases (96 per cent agreement). In two of the remaining cases the medical diagnosis was cardiac decompensation. There were 399 cases in which an x-ray diagnosis of "filled diseased gallbladder" was made. Seventy cases came to surgical operation and 54 of these were found to have diseased gallbladders or an agreement of 70 per cent. Sixteen cases were re-

X-RAY DIAGNOSIS OF GALLBLADDER DISEASE

GALLSTONES

Year	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	Total Cases	Per Cent
Medical agreement	1	1	5	4	5	5	4	5	3	3	36	55.40
Surgical agreement	0	0	4	5	7	5	0	2	4	2	29	44.60
Medical disagreement	0	0	0	0	0	0	0	0	0	0	0	.00
Surgical disagreement	0	0	0	0	0	0	0	0	0	0	0	.00
Total cases	1	1	9	9	12	10	4	7	7	5	65	100.00

NOTE.—Eight cases of non-filling gallbladders showed undetected stones at operation.
Diagnosis of tumor of gallbladder wall confirmed in one case.

GALLBLADDER NOT FILLED, PRESUMABLY DISEASED

Year	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	Total Cases	Per Cent
Medical agreement	4	6	10	6	21	11	8	5	12	6	89	75.42
Surgical agreement	1	0	1	7	4	1	2	2	4	1	23	19.49
Medical disagreement	0	0	1	1	0	0	0	0	2	0	4	3.39
Surgical disagreement	0	0	0	0	0	0	2	0	0	0	2	1.70
Total cases	5	6	12	14	25	12	12	7	18	7	118	100.00

GALLBLADDER FILLED, DISEASED

Year	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	Total Cases	Per Cent
Medical agreement	6	22	25	37	45	59	30	45	23	17	307	76.94
Surgical agreement	0	3	2	3	4	8	8	15	5	6	54	13.54
Medical disagreement	0	0	0	1	3	2	2	2	5	5	22	5.51
Surgical disagreement	0	0	1	4	2	2	3	2	0	2	16	4.01
Total cases	6	25	28	45	54	71	43	64	33	30	399	100.00

GALLBLADDER FILLED, NORMAL

Year	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	Total Cases	Per Cent
Medical agreement	6	9	4	11	11	11	19	5	17	11	104	78.80
Surgical agreement	0	1	0	3	0	0	4	1	3	1	13	9.90—88.64
Medical disagreement	2	5	1	3	2	0	0	0	1	0	12	9.00
Surgical disagreement	1	0	0	0	0	0	0	1	1	0	3	2.30
Total cases	9	13	5	17	13	11	23	7	22	12	132	100.00—11.36

ported by the surgeon as not diseased. Of these cases of disagreement with the x-ray diagnosis the most common surgical findings were pathology in the appendix, pelvis or kidneys. There were 329 medical cases in which no surgical work was done. The medical diagnosis agreed with the x-ray diagnosis in 307 cases (93 per cent). In the remaining cases of disagreement the clinical diagnoses were cardiac disorders or functional gastro-intestinal disorders. There were 132 cases in which the x-ray diagnosis was made of a normal gallbladder. Of this group 13 cases had surgical confirmation (81.25 per cent agreement), and in three cases there was surgical disagreement. In the medical cases the clinical diagnosis agreed with the x-ray findings in 104 cases (90 per cent agreement), and there were 12 cases of disagreement. The following tables show in detail this division with medical and surgical agreements and disagreements with the x-ray diagnosis.

Although all of these percentages are in keeping with the statistics given by other writers, I will discuss only one of these groups, the normal gallbladder. Probably the better term would be: not diseased from the radiological standpoint. All of the cases referred to our radiological department for visualization have had some signs or symptoms throwing suspicion upon the gallbladder. That we were able to rule out the gallbladder in 88.6 per cent of these cases is of vital interest to my colleagues and our patients.

Carman, MacCarty and Camp[2] in 1924 made the following statement:

> "It is doubtful whether any person more than thirty years of age can boast of possessing a normal gallbladder; at least it is much more commonly diseased than has been generally recognized. Consequently, assured before an examination of the support of the pathologist and usually of the surgeon, the roentgenologist needs only to discover a sign consistent with the presence of cholecystitis and his percentage of correct diagnosis will be exceptionally high."

I wonder how much the attitude expressed in this statement is the one now possessed by the roentgenologist. Because of this unspoken challenge I believe we should study more carefully all our questionable, border-line or doubtful cases. Re-examination should be made more frequently, especially if gallbladder surgery is contemplated. Do not let percentages sway you. Be sure that the gallbladder under examination is not normal.

What shall be considered a radiologically innocent gallbladder?

My premise is based on the assumption, apparently proven, that the normal gallbladder has the inherent powers of: (1) concentrating the hepatic bile; (2) emptying itself more or less completely when the pressure at the ampulla of Vater is released, and when the gallbladder is stimulated by some energizing substance or stimulant from the duodenum. Hence, the radiologically normal, phthalein-filled gallbladder should show: (1) a smoothly rounded outline; (2) greater concentration of the dye with or without change in size of the gallbladder shadow in a film made four hours after the first film; and (3) emptying of more than half of its contents in one hour after taking proper food. Even though the shadow of the gallbladder be dim, if it follow this routine it should be considered normal. The smaller amount of dye may be due to faulty absorption or delay in proper excretion by the liver, and in either case the gallbladder may not be actively involved in the pathologic process.

Pelvic disease in women often seems to upset the proper absorption or concentration of the dye, and cardiac disease in both sexes, by hepatic congestion, interferes with proper elimination of the dye. Patients showing active disease, either organic or functional, in the duodenum may show changes in the usual sequence of the findings, although Kirklin[3] doubts this. In all of these cases it is well to repeat the examination before condemning the gallbladder as the basically pathologic organ. We assume that a gallbladder once diseased is never a normal organ and may act as a focus of infection. I believe that this is true only in those cases in which the infection has produced sufficient change in the structure of the gallbladder wall to have crippled or destroyed its concentrating and contractile functions. Acute disease of the mucous membrane may subside without leaving permanent damage. Hence, repeating our visualizations in these cases will vitally influence their subsequent treatment. Let us reverse the usual assumption and consider the gallbladder normal until we can unquestionably know it to be diseased.

SUMMARY

We have studied the histories of 714 patients having cholecystography, with the purpose of determining the extent of agreement of the x-ray

findings with the final clinical (medical and surgical) diagnosis. Pratically 100 per cent of cases with x-ray findings of gallstones had clinical confirmation. In cases with the x-ray diagnosis of "non-filling diseased gallbladder" there was clinical confirmation in 95 per cent of cases. With an x-ray diagnosis of "filled diseased gallbladder" there was clinical confirmation in 90 per cent of the cases. With the x-ray diagnosis of "normal gallbladder" there was clinical agreement in 88 per cent of the cases.

The most common clinical diagnoses, in which there was disagreement with the x-ray findings, were pelvic disease, cardiovascular disease, or in a few cases disorders of the appendix or kidney.

We have given the diagnostic criteria for a gallbladder not diseased from the radiological standpoint. We are making an urgent plea that all gallbladders be considered normal until proven to be diseased.

I wish to express my appreciation of the cooperation of Dr. Fred T. Rogers, not only in the examination of these patients, but also the compilation of the statistics.

BIBLIOGRAPHY

1. Graham, E. A.; and Cole, W. H.: Roentgenologic Examination of the Gallbladder. J.A.M.A., **82**:613, Feb. 23, 1924.
2. Carman, R. D.; MacCarty, Wm. C.; and Camp, J. D.: Roentgen Diagnosis of Cholecystic Disease. Radiology, **2**: 80, Feb., 1924.
3. Kirklin, B. R.: The Normal Cholecystographic Response. Radiology, **11**:34, July, 1928.

DISCUSSION (*Abstract*)

Lt.-Col. Geo. M. Edwards, Fort Sam Houston, Tex.—The author's roentgen classification of his findings is unique.

Much has been written on the method of preparation of the dye and its administration as well as the proper preparation of the patient and the radiographic technic in cholecystography. Too much stress cannot be laid upon these factors. Added experience in the best methods of the oral as well as the intravenous administration and the necessary change in the roentgen factors to suit each individual case have tended to improve the results obtained by all roentgenologists. At present in busy x-ray sections such details as position, centering, immobilizing, and the determination of the x-ray technic is left to the experienced technician. Repetitions because of non-absorption of the dye or of faint shadow following vomiting or diarrhea is recognized as an essential by the technician with experience as well as the roentgenologist. These facts are mentioned merely to emphasize how carefully cholecystographic examinations are being made in our best x-ray laboratories.

It has long been established that the criteria for diagnosis in cholecystography are divided into the direct and indirect evidences. The former are the stone positive cases, be they opaque or non-opaque stones. The latter, or cases with indirect evidence, include the normally functioning, non-functioning and poorly functioning gallbladders. More recently, with improved technic, we are occasionally able to identify defects in filling, constant in location, and more evident at succeeding examinations as being due to papillomatous growths of the gallbladder. However, the classification in this paper of "gallbladder filled, diseased" is the most interesting to me, since it includes a group of cases which have given me more concern than all the others put together. The large number of cases of this type in the series (399, or 56 per cent of the total) emphasizes its importance. The criteria for arriving at a definite x-ray diagnosis have been much discussed. Such cases should include those in which the gallbladder fills, its shadow being unusually large or perhaps average in size and density with little or no evidence of shrinkage, or faint without evidence of either concentration or shrinkage. However, there must be other criteria of importance in this large group.

The second interesting feature of the paper is the explanation of the criteria the internists established for a positive diagnosis of gallbladder disease. A definite diagnosis of gallbladder disease cannot be established by cholecystography alone, as this is after all, in the majority of cases, only a functional test. What other method has proven more helpful to the clinician than cholecystography as carried out with the Graham Cole test? This is especially pertinent in view of the fact that all examinations were made on patients in whom the gallbladder was under suspicion.

It is generally agreed that in cases with cardiac decompensation and hepatic congestion liver function is impaired. However, with visualization or filling of the gallbladder it is not clear just why the further necessary criteria to a normal response were not fulfilled if the gallbladder was not diseased. It is readily understood why there were two disagreements in the group in which there were no visualizations or fillings because of cardiac decompensation.

A large number of positive findings is noted in the series. There were 582 (81.2 per cent) giving positive roentgen evidence of gallbladder disease. This is accounted for by the fact that all of the cases referred to the radiological section had had some signs or symptoms throwing suspicion on the gallbladder.

In most x-ray sections there is a mixture of cases referred, consisting of those with definite symptoms referable to the gallbladder, those with indefinite upper abdominal symptoms, and those in whom a thorough physical examination to determine the presence of focal infection is being made, but in whom there is no evidence of gallbladder disease. In such a group a much lower percentage of positives is found.

After all, however, is it not true that the findings at operation of a diseased gallbladder with pathological section and confirmation later is more accurate than the internists' agreement? In this connection it is again emphasized that those cases which came to operation were referred by the internist.

It is felt that the small number of cases in which a recheck was necessary is unusual.

Dr. Spangler (*closing*).—Colonel Edwards raises the question of the large number of negative cases in this series where each patient is supposed to have had some sign or symptom referable to the gallbladder. It has been our custom to consider our diagnoses of gastrointestinal cases incomplete until cholecystitis has been definitely ruled into or out of the picture. Hence, many

so-called normals have been visualized in this search for accurate information: many were considered clinically normal, but we desired further proof. Also many cases with upper right quadrant pain in which the genitourinary examination did not definitely condemn the right kidney were given a cholecystographic check.

In this paper I have carefully steered clear of the diagnostic problems of the diseased gallbladder. The discussion of size, shape, concentrating ability, relation of position to body habitus, pericholecystic adhesions, size and density of liver, relative value of the different methods of administering the dye, of the reactions in pathological cases, has been carefully avoided. Each of these subjects could be, and many have been, discussed at length elsewhere.

My plea is, consider your patient's gallbladder normal until you can definitely establish a pathologic condition.

DERMONECROTIC PROPERTIES OF STAPHYLOCOCCUS FILTRATES*

By PAUL F. STOOKEY, M.D.,
and
LOUIS A. SCARPELLINO, M.D.,
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When one considers the dermonecrotic, hemolytic and toxic properties of bacteria-free filtrates of various strains of pathogenic staphylococci, the subject opens a wide field in medicine involving all conditions where staphylocccci are present either as the primary invading agent or as concomitant organisms. We shall limit our observations in this presentation to the association of a dermonecrotic, hemolytic and toxic filtrate obtained from toxin producing staphylococci and its relationship to certain diseases of the skin. It is a fact that the direct inoculation of any of the pus producing group of organisms into the skin will, under certain favorable conditions, produce abscesses or tissue necrosis. It is our purpose to clarify, if possible, the role of the staphylococcus exotoxin as the etiological agent of extensive tissue damage associated with necrosis.

The surgical literature relative to carbuncle-like infections with extensive necrosis of tissue that develop in the skin as a result of embolic deposit of bacteria or which occur following direct inoculation subsequent to operative procedures, generally developing in the wound as a stitch abscess, is probably due to the same underlying etiological and pathological process that produces the extensive necrosis of the skin described by Brunsting, Goeckerman and O'Leary[2] as pyodermia gangrenosa. Lane and Stroud[3] have also reported such a case.

In our opinion pyodermia gangrenosa has much in common with osteomyelitis. In primary osteomyelitis the staphylococcus is blood borne from a primary focus usually situated in the skin, and after a varying period of pyemia is embolically deposited in the bone, which produces the osteomyelitis. Pyodermia gangrenosa represents a reversal of this process. There is usually a primary focus, frequently hidden, from which the staphylococcus enters the blood at irregular intervals to be embolically deposited in the skin.

To the recorded cases of pyodermia gangrenosa we wish to add another case.

J. D., a married man, aged 46, presented himself at the office of Dr. Leon Rosenwald on August 1, 1934. At the time of his original examination there was a tense furuncle-like swelling of the distal phalanx of the small finger of the right hand, which was evidently the result of a severe paronychia. No axillary glands were palpable at this time. Local applications were applied and one week later fluctuation was noted and the nail was removed. At this time there was adenopathy in the right axilla, which was drained. No bacteriological studies were made, although the pus was yellow, thick, and had all the physical characteristics of *Staphylococcus aureus* infection. One week subsequent to incision there was a sharp chill followed by a rise in temperature to 103° F. accompanied by a pulse of 120 per minute. The chill was followed by a widely distributed eruption deeply seated, blue black in color, involving the trunk and extremities. The lesions varied greatly in size. On the trunk they were from 0.5 to 2 cm. in diameter. On the extremities the lesions were small, numerous, and they at once called to mind the embolic deposit of the meningococci frequently seen in the septicemic stage of epidemic meningitis. Over a period of two weeks the patient suffered two other severe chills, followed by the appearance of new lesions on the body. During this time the patient had fluctuation in temperature, rapid pulse, increasing weakness and pallor, and the loss of 25 pounds in weight.

The small lesions became blue-black in color, but did not break down or produce scars. The larger lesions, situated on the trunk, were blue-black in color, rapidly became necrotic and exuded a thick pus tinged with old hemolyzed blood. The walls were punched out and at the border were blue-black. They later became brown, healing slowly with scar formation. Direct smears and cultures showed both nonhemolytic streptococci and markedly hemolytic staphylococci.

We have previously worked with an extensive number of filtrates from various hemolytic and nonhemolytic streptococci. We are not familiar

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*From the Department of Dermatology of the Contagious Service of the Kansas City General Hospital, Kansas City, Missouri.

*We are indebted to Dr. Ralph Emerson Duncan for the cooperation of the laboratory and the use of its facilities, and to Dr. Frank J. Hall for the interpretation of the pathologic and histologic specimens.

Fig. 1, Case J. D.
Case of pyodermia gangrenosa. Note the ulcerating lesions on the left buttock. Unfortunately the patient would not allow a picture to be taken at the height of the eruption.

with any filtrate obtained from a streptococcus that will necrotize tissue.

From this fact, and the peculiar necrotizing character of the lesions encountered, we were inclined to believe that the staphylococcus must be the organism that demanded investigation. The literature relative to staphylococcus toxin is rather extensive. Without attempting to review this literature, we shall state that most of the early work was done by Parker, in New York, and Burnett, in Australia.

To obtain staphylococcus toxin, the original culture should be made in sugar-free media. Many strains of the staphylococcus are toxin makers, but upon repeated subculture they lose their toxin-making properties, and if the hydrogen ion concentration of the media is not adjusted properly, toxin formation will be inhibited or abolished. Animal passage will restore the original toxin-making properties of the staphylococcus. The necrotic properties of the filtrate usually disappear before the hemolytic properties. This toxin, as is characteristic of all free toxins, has a marked antigenic action. Immune substances are carried in the pseudoglobulin fraction of the blood serum. Some observers[4] consider the hemolysins elaborated by several species of bacteria to be identical. If this observation is true, antihemolysins, due to hemoglobin-destroying organisms, should cross-neutralize one another.

In our work with the isolation of this toxin we first used Burnett's technic, but after more experience we modified our procedure and at present we are using a combination of the Burnett and Parker technics.

The bacteria-free filtrate obtained from the staphylococcus from Dr. Rosenwald's case was a good toxin maker which hemolyzed washed rabbit cells in a dilution of 1 to 1,280. One-tenth c. c. of the toxin injected into the back of a plucked rabbit produced a hemorrhagic area within twelve hours, which later ulcerated. Given intravenously to a rabbit in a dose of 0.5 c. c. per kilo, it proved fatal within twenty-four hours.

In a comparison of our case with those previously reported by Brunsting, Goeckerman and O'Leary,[2] and also Lane and Stroud,[3] a primary focus with secondary manifestations in the skin was the outstanding clinical feature. From the cases reported by Brunsting, Goeckerman and O'Leary, staphylococci and streptococci were the predominating organisms in the ulcerating lesions. In Lane and Stroud's case staphylococcus was obtained from the blood. In all cases concerned the production of new lesions was preceded by chills and fever. In our particular case the lesions were not so large. In all cases here reported the formation of new lesions in the skin was preceded by evidence of blood stream invasion from a focus which was sometimes obvious but frequently concealed. The rapidly necrotic properties of the ulcers must be due to a powerful lytic agent. This we believe to be the exotoxin of the staphylococcus which, in our experience, is one of the most rapidly necrosing toxins elaborated by pathogenic bacteria.

Loeb,[5] in 1903, was the first to call attention to the power of the staphylococcus to cause coagulation of blood plasma. This has been interpreted to be due to a substance that acts like thrombokinase. Thrombosis of vessels is a well known feature of staphylococcic infections.

We have worked with staphylococci obtained from three cases of vegetative bacterial endocarditis. The blood cultures were positive in all three cases for *Staphylococcus aureus* which possessed hemolytic and dermonecrotic properties.

STAPHYLOCOCCUS CULTURES

Type of Case	No. of Cases	Cases Showing Hemolysis	Cases Showing Necrosis	Cases Showing No Hemolysis	Cases Showing No Necrosis
Vegetative bact. endocarditis	3	3	3	0	0
Cavernous sinus thrombosis	4	4	4	0	0
Furuncles	14	12	9	2	5
Osteomyelitis	19	15	13	4	6

Fig. 2, Case 60749
Cavernous sinus thrombosis. First picture (left) taken July 18, 1934. Second picture (right) taken July 19, 1934.

In nineteen cases of primary osteomyelitis, studied to date, staphylococci were isolated in all instances. Fifteen were found to have hemolytic properties, and of these thirteen produced a dermonecrotic toxin. Four cases of cavernous sinus thrombosis, secondary to furuncles in the danger area, all showed dermonecrotic and hemolytic toxin. From the pus obtained from fourteen furuncles staphylococci have been isolated in all instances. Nine were found to be hemolytic and necrotic, three were hemolytic and non-necrotic, and two lacked completely either hemolytic or necrotic properties.

In our experience, cavernous sinus thrombosis results from a staphylococcus infection in the anatomic area which drains into the skull, chiefly through the angular and ophthalmic veins. The primary lesion is usually a furuncle. There is a secondary thrombosis into the veins leading into the cavernous sinus with an extension of the thrombus in the cavernous sinus. We wish briefly to report one case.

Case 60749.—A white woman, aged 37, married, was admitted to the hospital July 17, 1934, with the history that four days previously she had a "pimple" in the nose, which was incised. That same evening she had a swelling of the upper lip, which progressed, and the day before her admittance into the hospital she had a temperature of 103°. When she was admitted to the Isolation Hospital, she was irrational and disoriented and had to be restrained. Her temperature was 104°, pulse 130, and respirations were 28. Because of the fixation of the eyeballs and proptosis, a diagnosis of cavernous sinus thrombosis was made and substantiated by autopsy. Staphylococci were obtained from the local lesion. The filtrate obtained from the culture showed hemolysis in dilution of 1 to 1,280 and the dermonecrotic properties were marked.

We have, to date, three other similar cases of cavernous sinus thrombosis all having positive blood cultures for *Staphylococcus aureus*. It is

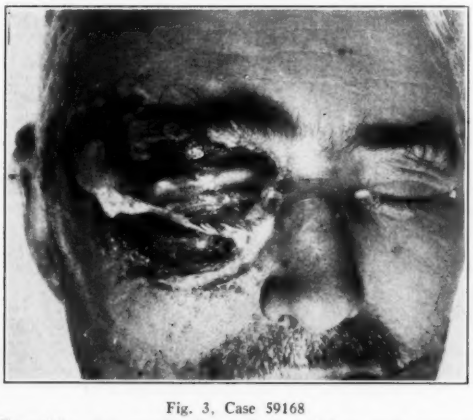

Fig. 3, Case 59168
Necrotizing ulcer complicating erysipelas. Patient made recovery with loss of vision of right eye.

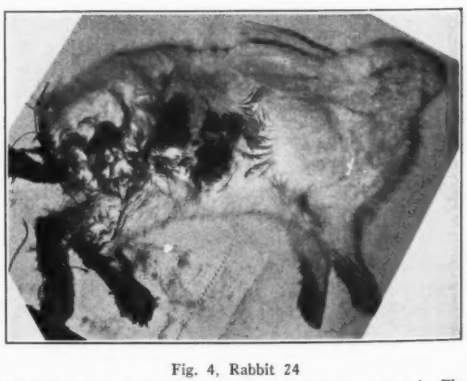

Fig. 4, Rabbit 24
Three areas were injected with 0.1, 0.3 and 0.6 c. c. of toxin. The rabbit died thirty minutes after the picture was taken. Note the marked emaciation and how the rabbit is soiled.

our opinion that only toxin-making staphylococci produce cavernous sinus thrombosis. This will be the subject of a future presentation.

We[6] have previously reported five instances of superimposed staphylococcic infection occurring late in the course of erysipelas. Since this report appeared in the literature we have had the opportunity of observing the sixth case:

Case 59168. — An unmarried man, aged 56, was admitted to the Isolation Hospital with typical erysipelas; temperature 100°, pulse 80, and respiratory rate 20. The day following his admittance into the hospital, erysipelas serum was given intramuscularly and in two days the area of skin involved showed evidence of remission. However, the right upper eyelid was beginning to show necrosis and this spread quite rapidly, involving both the upper and lower eyelid and the area over the zygoma. The superficial anterior chain of lymph nodes of the neck were tender, but did not suppurate.

A retrobulbar abscess formed, which was later drained, and the patient made a recovery with loss of vision in the right eye. The staphylococcus obtained from this necrotizing ulcer was a typical toxin-maker.

The two latter cases are examples of external implantation of virulent toxin-making staphylococci causing necrosis of tissue. It is very probable that toxin-making staphylococci produce but minor lesions when invading the skin of an individual who has circulating in his blood a high titer of natural antitoxin elaborated by previous staphylococcic infection. The behavior of the diphtheria toxin has been the subject of much study. Staphylococcus toxin, on the other hand, has received

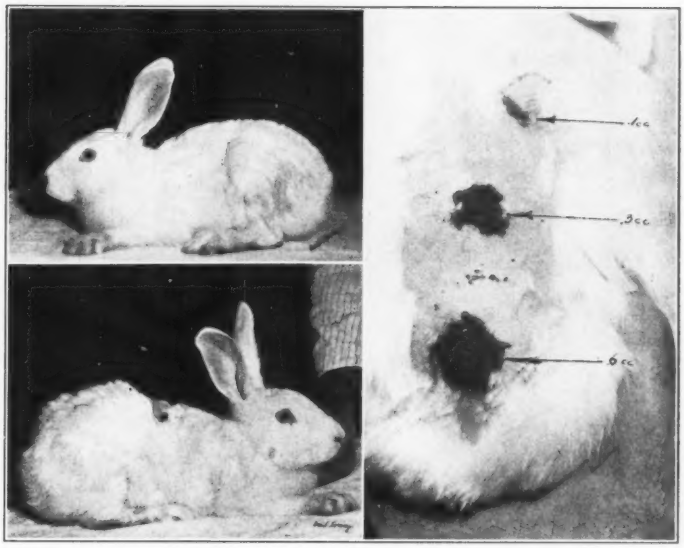

Fig. 5. Rabbit 36

Shows weight loss and the appearance of the back. (Top left) Appearance of rabbit before injection of the toxin. (Bottom left) Appearance of the rabbit after injection of the toxin, showing weight loss. Rabbit lost seven and one-half ounces in four days after injection of toxin. (Right) Appearance of the back with injection of 0.1, 0.3 and 0.6 c. c. of toxin intracutaneously.

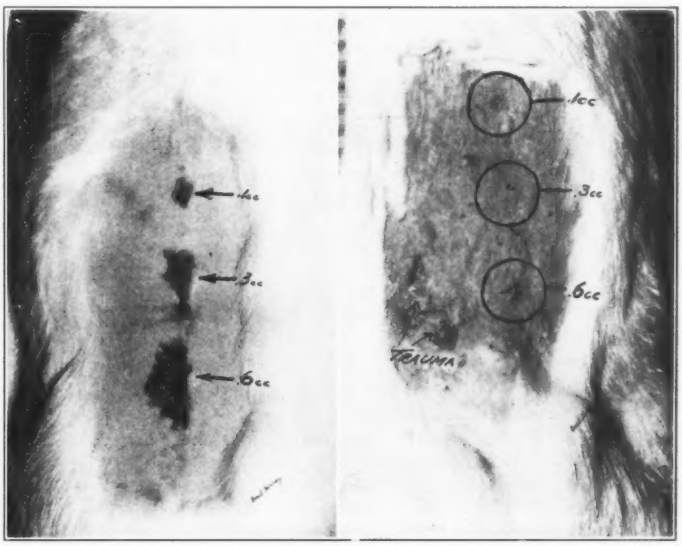

Fig. 6, Rabbit 38

Shows loss of virulence of toxin-making properties of the staphylococci after isolation. (Left) Appearance of the back of the rabbit with toxin made on August 26, 1934. (Right) Appearance of the back of the rabbit with toxin made on October 4, 1934.

comparatively little attention. When viewed from this angle the problem becomes immense and will demand years of careful study before all the facts relative to staphylococcus immunology are known.

CONCLUSIONS

(1) In many destructive lesions of the skin a toxin-forming strain of staphylococcus may be readily isolated.

(2) Many strains of staphylococci produce a dermonecrotic, hemolytic and toxic filtrate.

(3) Destructive manifestations of staphylococcic infections of the skin may be embolic in character or may result from direct or superimposed inoculation.

(4) In a general way hemolysis is an index of demonstrable toxin formation and dermonecrotic properties.

(5) In all pathological conditions of staphylococcic etiology the toxin formation may account for a considerable part of the clinical and pathological picture.

BIBLIOGRAPHY

1. Christopher, F.: Severe Spreading of Carbuncular Infection of Chest Wall Following Rib Resection Under Local Anesthesia. Surgical Clinics of N. A., p. 795, 1924.
2. Brunsting, Goeckerman and O'Leary: Pyodermia (Echthyma) Gangrenosa. Arch. Derm. & Syph., **22**:655, 1930.
3. Lane, C. W.: and Stroud, C. M.: Pyodermia Gangrenosum. Arch. Derm. & Syph., **27**:460, 1933.
4. Powell, H. M.: The Serum Neutralization of Hemotoxins. Proceedings of the Indiana Academy of Science, **40**:181-183, (1930), 1931.
5. Loeb, Leo: The Influence of Certain Bacteria on Coagulation of Blood. Jour. Med. Res., **5**:407, 1903.
6. Stookey, Ferris Parker; and Scarpellino, English: Necrotizing Ulcers Complicating Erysipelas. J.A.M.A.

TUMORS AND TUMOR-LIKE CONDITIONS OF THE LYMPHOCYTE, THE MYELOCYTE, THE ERYTHROCITE AND THE RETICULUM CELL*

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Hyperplasias, either reactive or neoplastic, arising from the cells which produce the cellular elements of the blood, are perhaps more difficult to classify and diagnose than any other group of conditions with which the pathologist has to deal. These difficulties are caused in part by the fact that there is no sharp line between reactive and neoplastic proliferations, and in fact conditions which appear reactive may become neoplastic. Another factor is that even as Hodgkin confused some of these conditions over 100 years ago as a result of clinical and gross morphological observation only, so today varied names are given to conditions arising from the same cell, because the symptoms are due to dysfunction of the part affected by the hyperplasia, rather than by the products or function of cell growth. And so it happens that in textbooks published as late as the current year, 1934, we find included under the term "lymphoblastoma" both lymphatic and myelogenous leukemia and multiple myeloma.

When lymph nodes, marrow or parenchymatous organs are involved by a tumor process the symptoms are caused by the impaired function of the structure, but the pathological entity is only defined by determining the cell giving rise to the involvement. For example, similar symptoms are found in persons having the Hodgkin's type of reaction or hyperplasia in the lymph nodes and in those in which the same group of nodes is affected by the lymphocytic proliferation of lymphatic pseudoleukemia, better termed aleukemic lymphocytoma. In these hyperplasias of the blood cells there is difficulty in differentiation, as the more embryonal forms, the blast cells giving rise to these various elements of the circulating blood, cannot be differentiated one from the other if taken alone. The type of tissue they produce, the sites in which the changes occur, and the cells which are mobilized into the circulating blood, assist in differentiation, and on these we must depend for diagnosis.

All the cellular elements of the blood increase as a response to various influences more or less deleterious. Therefore, all may be said to produce a reactive hyperplasia. Likewise, all give rise to proliferations in which there is an increased number of cells in the blood, and when this increase persists the term "leukemia" is used to designate it. Also, each of the cells produces a condition or conditions in which the morphological changes and often the clinical symptoms are similar to those of the leukemic forms except that leukemia is not present. In other words, the proliferating cells are not mobilized into the circulating blood. Such conditions are well termed "pseudoleukemia." Finally, malignant tumors are produced by these cells, sometimes accompanied by a mobilization of the cells in the blood, leukosarcoma, and sometimes not so accompanied.

In studying the entire group it constantly must

*Read in Section on Pathology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

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be kept in mind that the tissues giving rise to the cells are generalized, not localized. Hyperplasias of marrow cells, erythrocyte and leukocyte, have their origin in any or all bones, spleen and possibly hemolymph nodes. Hyperplasias of lymphocytes similarly arise from any or all nodes, spleen and the lymphocyte collections normally in many organs; while the reticulo-endothelial system is universally distributed. Thus, while usually there is a location of greatest intensity in these processes, reactive hyperplasias and the non-metastatic neoplastic types tend to be generalized; while the malignant or sarcomas metastasize from a primary focus. Sarcomas of these cells, unless leukemia be also present (leukosarcoma), may involve but little of the particular tissue from which they arise.

The following systematic classification is offered in order to promote the study of these conditions and to stimulate interest in the American Registry of Pathology, Lymphatic Tumor Division (*Table 1.*) It is hoped that those who read this article will register their cases that sufficient material may be collected either to refute, modify or confirm the statements herein. It will be noted that the reticulum cell group is divided into two parts so that the term "Hodgkin's disease" may be included in the classification. Studies in this condition are still not sufficiently exact to allow a definite statement to be made as to whether Hodgkin's disease, as ordinarily understood, is ever a reactive hyperplasia, or, on the other hand, if in its characteristic form it is ever a tumor.

THE LYMPHOCYTE

In the reactive group there is still a question as to whether there is such a thing as a benign lymphoma; in other words, whether a proliferation of lymphocytes is not always either reactive or neoplastic in the sense that it is clinically malignant.

The two forms of leukemic lymphocytoma need little discussion. In the acute form the cells approach the lymphoblast in type, and usually the condition occurs at the earlier ages and is rapidly progressive, though irradiation occasionally slows the progress and changes somewhat the character of the cells, so that the leukemia approaches the chronic in type. Both chronic and acute may have aleukemic phases and may terminate in sarcoma.

The aleukemic lymphocytoma (lymphatic pseudoleukemia) occurs in two forms. In the first, one finds an overgrowth of the small lymphocytes, an enlargement of the primary nodules, the hyperplasia gradually making the node a uniform mass of lymphocytes, the normal markings as seen with the ordinary tissue stains being obliterated. At the earlier ages the proliferating cells are usually of the larger size, mitoses are often abundant, and the nodules sometimes retain their peripheral reticulum, which may show some condensation. X-ray retards the process to some extent and may precede the occurrence of a leukemia, or the latter condition may arise spontaneously. In the absence of leukemia only section will differentiate these conditions from

Table 1

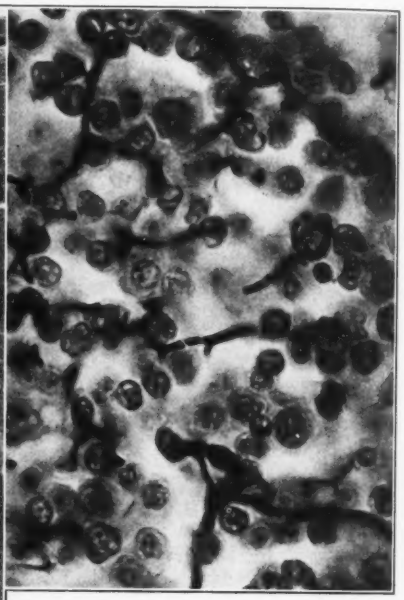
CLASSIFICATION OF TUMORS AND TUMOR-LIKE CONDITIONS OF THE LYMPHATIC, HEMOPOIETIC AND RETICULAR TISSUES

	Lymphocyte	Myelogenous		Reticulum Cell
ADULT CELL TYPE	Lymphocyte	Granular leukocytes	Red blood corpuscles	Monocyte—reticulum cell
REACTIONS	*"Lymphoma" Leukocytosis	Leukocytosis	Symtomatic polycythemia	Tuberculosis, leprosy, etc. Localized Hodgkin's disease
PROLIFERATIONS OF NEOPLASTIC TYPE	Leukemic lymphocytoma (1) Chronic (2) Acute	Leukemic myelocytoma (1) Chronic (2) Acute	(1) Polycythemia vera (Syn.: erythremia) (2) Leukemic erythrocytoma	Leukemic reticulocytoma (Syn.: monocytic leukemia)
	Aleukemic Lymphocytoma (1) Diffuse (2) Nodular	Aleukemic Myelocytoma (1) Single (2) Multiple (Syn.: multiple myeloma)	*Aleukemic erythrocytoma	Aleukemic reticulocytoma Cells uniform Cells pleomorphic Generalized Hodgkin's disease
MALIGNANT TUMORS	Lymphosarcoma (1) Aleukemic (2) Leukemic (Syn.: lymphatic leukosarcoma)	Myelosarcoma *(1) Aleukemic (2) Leukemic (Syn.: myelocytic leukosarcoma) Chloroma	Erythrosarcoma *(1) Aleukemic (2) Leukemic	Reticulum cell sarcoma Aleukemic Cells uniform Cells usually pleomorphic; sarcomatous. Leukemic Hodgkin's

*Type not observed in Registry.

Hodgkin's disease, though the usual generalized distribution is of aid.

The second type is the nodular aleukemic lymphocytoma, first known under the term of "giant follicular hyperplasia with splenomegaly." This is characterized grossly by an enlargement of lymph nodes, usually accompanied by an increase in the size of the spleen. Histologically, there appears to be an enlargement of the secondary nodules and an increase in their number. The condition occurs with greatest frequency in the fourth decade, is very susceptible to the x-ray, and frequently terminates in a metastatic lymphosarcoma of the large cell type. Often the cells show such pleomorphism that the condition has been diagnosed sarcomatous Hodgkin's disease.



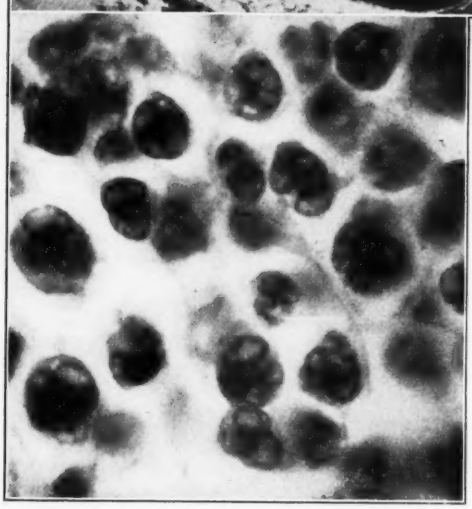


Fig. 1 (top left).—Aleukemic lymphocytoma, showing enlargement of lymph nodules of primary type.

Fig. 2 (top right).—The characteristic reticulum of the lymphocyte group. Photograph of node of leukemic lymphocytoma.

Fig. 3 (bottom right).—Atypical cells of metastasizing lymphocytoma. Lymphosarcoma.

Lymphosarcoma occurs with or without leukemia. An aleukemic form may become leukemic spontaneously or more often following the use of irradiation. In the aleukemic form it is characterized by invasiveness and usually by definite metastatic deposits in places in the body where normally there are no lymph node structures, as in the intermediate zone of the liver. This invasiveness and metastasis, together with the usual atypical character of the cells, are the criteria whereby it is differentiated from the leukemic and aleukemic lymphocytomas, the cellular changes of which are confined to positions in which there are normal nodes or collections of lympho-

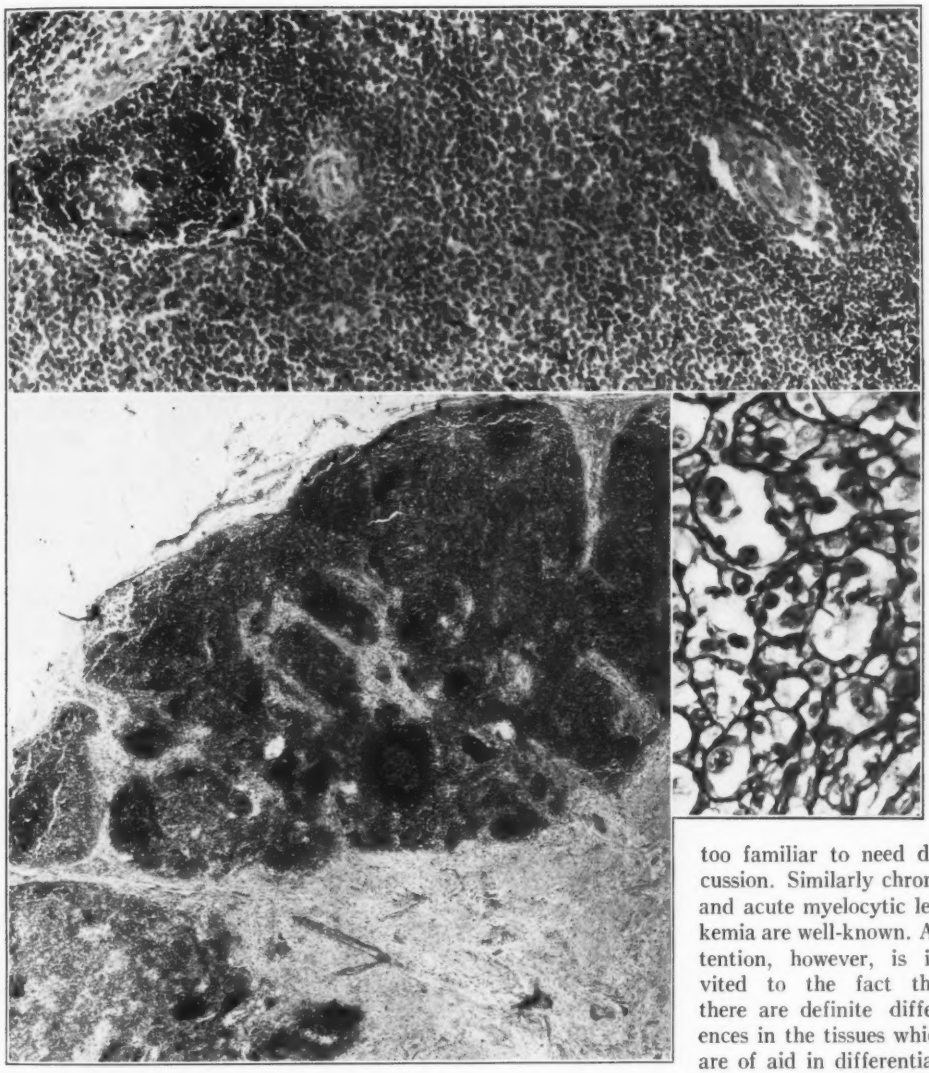


Fig. 4 (tou).—Spleen of leukemic myelocytoma. Note that the proliferation is between the lymphocytic nodules (Malpighian follicles).

Fig. 5 (left).—Lymph nodes of Hodgkin's disease, reactive type. Note that the sclerosis of the disease surrounds the lymphocytic (primary) nodules.

Fig. 6 (right).—Reticulum in the generalized Hodgkin's process. Aleukemic reticulocytoma. This reticulum, closely surrounding the cells, is characteristic of reticulum cell proliferations.

cytes, as in the portal connective tissue of the liver.

THE MYELOCYTE

This cell gives rise to the polymorphonuclear leukocytes of the blood, increases of which are diffusely, it will be found that the primary nodules are decreased in size and the cells are diminished in number, while the bulk of the infiltration will be between these nodules. In the lymphatic group there is an

too familiar to need discussion. Similarly chronic and acute myelocytic leukemia are well-known. Attention, however, is invited to the fact that there are definite differences in the tissues which are of aid in differentiating between the myelogenous and lymphogenous hyperplasias. While the myelogenous group of conditions may infiltrate lymph nodes more or less

enlargement with or without diffusion of the primary nodules, secondary nodules, or both. In the liver the increase in size of the portal areas as a result of lymphocytic proliferation often of large amount, characterizes the lymphocytic group, while the myelocytic infiltrations are rarely of great size and the small lymphocytes usually can be made out in addition to the myelogenous infiltration. In the spleen, in the lymphocytic group the malpighian nodules are increased in size, often crowding the red pulp. In the myelogenous group the hyperplasia occurs in the red pulp, crowding and sometimes almost obliterating the malpighian nodules.

The aleukemic myelocytoma occurs as the single and multiple myeloma, many of which are confined to the bone and, although destructive, even as a lymphocytoma may destroy structures in its vicinity, they do not metastasize. Rarely a single or multiple myeloma becomes leukemic, and usually proper search reveals myelocytes in the peripheral blood. Occasionally the myelomas invade outside of the bone and a metastatic tumor may arise without leukemia, though the majority of the sarcomatous myelomas are leukemic and therefore may be correctly termed myelocytic leukosarcoma. Chloroma may be found in both the leukemic and aleukemic forms, but more frequently leukemia is present.

RED BLOOD CORPUSCLES

Polycythemia of the symptomatic type, such as occurs at high altitudes, appears to be a reactive hyperplasia, while erythremia or polycythemia vera appears analogous to the chronic forms of leukemia in that the cells are all the adult type. Acute leukemia is represented by leukemic erythrocytoma in which the cells are not differentiated; in fact, they look more like abnormal lymphocytes than any other cells of the circulating blood. This condition is characterized by multiple petechial hemorrhages in

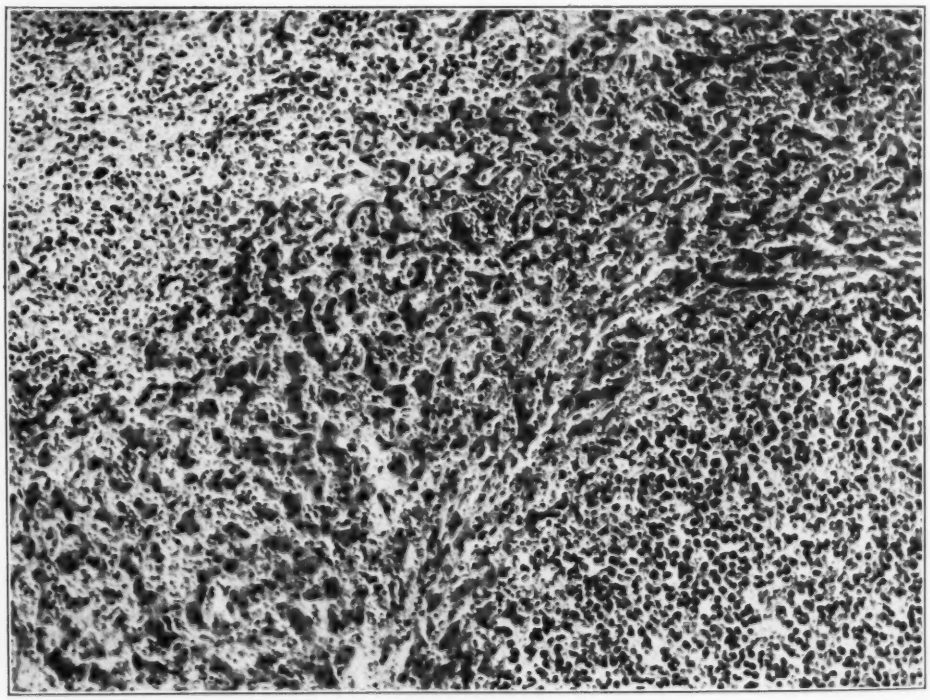


Fig. 7.—Liver of a general Hodgkin's in which a reticulum cell sarcoma has developed. Upper left corner shows polymorphous reticulum cell proliferation in a portal area. Practically all of these areas were involved. Lower right is the reticulum cell sarcoma (sarcomatous Hodgkin's disease).

the skin and especially in the serous membranes, while the hyperplasia, in addition to that in the marrow, involves the red pulp of the spleen, as is the case of the leukemic myelocytomas, though the infiltration is rarely as dense and hematopoiesis is obvious. Infiltrations in the lymph nodes have lead to the opinion that the lymph nodes enter into the production of the cells. The change, however, appears more like an infiltration such as occurs in myelogenous leukemia. The presence of megakaryocytes in the proliferations has caused these conditions to be linked with Hodgkin's disease.

Aleukemic erythrocytoma appears to be represented by the so-called erythroblastic anemia seen in the earlier age. Grossly, this is characterized by hyperplasia of the erythropoietic type in the marrow, with some destruction of the bone and thinning of the cortex somewhat similar to the condition seen in multiple myeloma.

The only conditions which may be termed erythrosarcoma with which the author has had experience have been leukemic, and time alone will tell whether an aleukemic erythrosarcoma occurs. The leukemic form differs only from leukemic erythrocytoma by the presence of metastases. These erythrocytic conditions are often characterized at first by anemia and the presence of large numbers of blasts, with a high proportion of megaloblasts. The white cell count varies, often not exceeding 100,000, but occasional cases show as many cells as do the ordinary myelogenous leukemias. In the blood, however, there is no increase in the granular cells, as is constantly present in the myelocytic conditions. The observed cases are too few to give further criteria for diagnosis.

RETICULUM CELL

This cell is prone to proliferate in many diseases of varied character such as tuberculosis, tularemia and leprosy, while those ill-defined conditions known as Gaucher's and Niemann-Pick's disease are hyperplasias of these cells. Likewise, the localized sclerosing form of Hodgkin's disease, accompanied by local and often by general increase in eosinophils, frequently marked by necrosis and largely confined to one general locality and the neighboring lymph node groups, answers the requirements of a reactive hyperplasia rather than a new growth. Yet this condition occasionally terminates in a metastatic sarcoma of the reticulum cells, a rather unusual termination for an inflammatory reaction.

The leukemic reticulocytoma has been more often called monocytic leukemia. The cells are somewhat difficult to differentiate from myeloblasts, but in the tissues the distinction is more clear. The process consists of a hyperplasia of large cells, most often in the lymph nodes, the proliferation being between the nodules, often crowding them to an extreme degree. In these locations the differentiation is easiest by the use of the reticulum stain of Bielchowsky or some of its modifications, whereby it will be seen that wherever these cells actually form a tissue, in other words, are not purely infiltrative, abundant reticulum surrounds practically each and every cell of the new growth.

The aleukemic reticulocytoma occasionally occurs as a relatively uniform cell structure without invasiveness or metastasis, which thus differentiate it from reticulum cell sarcoma. That form of Hodgkin's disease, which involves practically all lymph nodes of the body, has the same distribution of its lesions as is found in monocytic leukemia, but with more cell pleomorphism. The same dense intimate reticulum is formed, yet necrosis and sclerosis, except under the influence of x-ray, is notably absent. It more frequently terminates in sarcoma than does the localized or sclerosing Hodgkin's processes.

The sarcomas arising from these cells vary considerably in the type cell, some being relatively uniform and easily classified with their abundant reticulum, as reticulum cell sarcoma. Such ones may be the termination of the localized or generalized Hodgkin's process, but more often the sarcomas arising in a Hodgkin's disease are much more pleomorphic, some of the cells being of the Sternberg type. The liver is an important organ for the differentiation between the generalized and localized Hodgkin's process, for in the localized form, even if sarcomatous, only isolated nodules are present, and these may or may not appear to involve the portal areas, while the liver involved in the generalized Hodgkin's process shows an involvement of most of the portal areas by reticulum cell proliferation, the distribution being like that seen in lymphatic leukemia and lymphatic pseudoleukemia. Occasionally monocytic leukemia occurs in a sarcomatous reticulocytoma.

REFERENCE

Callender, G. R.: Tumors and Tumor-Like Conditions of the Lymphocyte, the Myelocyte, the Erythrocyte and the Reticulum Cell. Amer. Jour. Path., **10**: No. 4, July, 1934.

DISCUSSION (*Abstract*)

Dr. Harry C. Schmeisser, Memphis, Tenn.—Because of the existing confusion of our knowledge of the tumor

and tumor-like conditions of the lymphocytic, hemopoietic and reticular tissues the Lymphatic Tumor Registry of the American Association of Pathologists and Bacteriologists was established in 1925 and Colonel Callender was made Registrar. In this capacity he has had an excellent opportunity to study these conditions, and it was with great pleasure that I read his article on this subject in the July number of the *American Journal of Pathology* and have enjoyed even more this presentation of the subject.

Dr. Callender (closing).—The point of the principal argument in this discussion is the differentiation between the two types of so-called "Hodgkin's disease." The first is considered by me to be a reactive hyperplasia of unknown etiology; the second an aleukemic reticulocytoma. Reactive "Hodgkin's disease" is characterized by a localized swelling of lymph nodes or nodules, usually ushered in by febrile disturbances and more often occurring at the earlier ages, fourth decade and earlier. The condition has exacerbations and remissions either following x-ray or spontaneously; it may extend to neighboring structures and groups of nodes, but does not spread to all lymph node groups, including the lymphocytic structures of the spleen, liver and intestine, unless, of course, these structures be primarily affected. Isolated nodules may occur anywhere in the body, but the involvement is not generalized. Grossly the nodes are more or less intimately adherent to each other and the surrounding tissues. Microscopically, there is fibrosis affecting first the internodular stroma, starting as an increase in reticulum cells and reticulum, frequently accompanied by necroses of caseation type and a considerable but varying eosinophilic infiltration. X-ray causes decrease in the size of the nodes and, taken early, the course may be markedly prolonged by irradiation. In occasional cases of this type, after considerable periods of illness, a definite malignancy of the reticulum cell may be found. This one occurrence is unusual for reactive hyperplasias.

The second type, though often first discovered in one locality, quickly spreads through the greater part of the lymphocytic tissues. It usually involves the lymph nodules of one or more organs, especially the liver, spleen and intestine. When it involves the liver especially, practically all of the portal areas are so involved, eosinophilia is scanty or absent, reticulum proliferation, though most marked in the internodular stroma, is much more diffuse than in the reactive form. Necroses I have not seen and sclerosis is usually not marked except under the influence of irradiation. The process, being generalized, is less satisfactory to treat and more rapid in its course. It may be accompanied by fever, just as the analogous conditions produced by the erythrocyte or myelocyte may be accompanied by fever which is probably due to the lack of normal activity of the affected cells rather than to the condition itself. Occasionally metastatic reticulum cell tumor occurs, in fact more often than in the reactive hyperplasia of Hodgkin's granuloma.

COARCTATION OF THE AORTA: ITS IMPORTANCE AND DIAGNOSIS*

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and
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Congenital heart disease is a subject that holds little interest for the general medical profession. Such a feeling has in general been due to and in a measure justified by the fact that in the hands of those most familiar with congenital heart disease clinical and postmortem diagnoses have shown poor conformity and because therapy of all types of lesions is unsatisfactory. Coarctation of the aorta has been considered a rare congenital anomaly. Why, then, is one justified in reporting cases or discussing its diagnosis? No one admires the physician who has the unfortunate characteristic of laboring long to diagnose the rare diseases and of overlooking the common ones. It can, however, be shown that coarctation of the aorta is not so rare as was formerly thought. Statistical studies indicate its occurrence about once in every 1,550 autopsies (Table 1). Clinical diagnosis of the abnormality had been proven by necropsy in only 19 cases at the time of Maude Abbott's[1] elaborate study in 1928. This means that the great majority of such cases are being overlooked. Thanks to the work of Railsback and Dock,[2] Ernstene and Robins[3], and of Fray[4], on the roentgenologic signs of coarctation, it is no longer necessary or even permissible that these cases be overlooked. At the Peter Bent Brigham Hospital it has been possible, as noted by Eppinger and Midelhart,[5] to discover five cases

Table 1†

INCIDENCE OF COARCTATION OF AORTA AS FOUND AT NECROPSY

Author	No. Cases	No. Necropsies
Lochte (1908)	4	10,000
Fawcett (1905)	18	22,316
Joffe and Sternbern (1921)	1	4,500
Meixner (1922)	16	21,481
Hansteen (1925)	4	10,000
Ophuls (1926)	1	3,000

Average, 1 case in 1,550 necropsies.

†From report of Blackford.

*From the Vicksburg Hospital and Vicksburg Clinic, Vicksburg, Mississippi.

*Received for publication November 7, 1934.

in a period of approximately two and one-half years. We have watched carefully for this anomaly in the past six months, and in our clinic, which has an average of 1,600 patients per month, we have discovered two cases, which are reported below.

Granting, then, that this form of congenital heart disease is not uncommon, and that it can be diagnosed, why is it important to make such a diagnosis? Most of the cases that are overlooked pass under a diagnosis of chronic nephritis with hypertension or as essential (malignant) hypertension. Each of these offers a very poor prognosis. The patient, as was one of those reported below, is usually advised that his or her span of life will probably not exceed a few years. Such a pessimistic attitude is not warranted for cases of coarctation. The majority of patients with this anomaly probably die in the third and fourth decades of life. Over 70 per cent of them die from some cause related to the cardiovascular system.[7] If the diagnosis is made early and the patient warned against excessive physical exertion, which not uncommonly brings on cerebral accidents or rupture of the aorta, and if the patient's life is restricted to a low level of activity, these accidents will occur less frequently. Also, the onset of congestive heart failure, which will undoubtedly be the cause of death in many others, may be delayed by many years. The end result will be greatly to increase the average age of death in these cases and to enable many of them to lead a happy and useful life.

On account of the above considerations it appears important to re-emphasize some of the points in diagnosis, particularly the roentgenological findings. For a more detailed study the reader may consult the works of Abbott,[1] King[6] or Blackford.[7] The best single lead in arriving at the diagnosis clinically is the finding of an elevated blood pressure in a relatively young patient. Not all, but certainly the majority of patients with coarctation have a hypertension in the upper extremities. Having discovered the hypertension, one looks at once for evidence of collateral circulation in the thorax and neck. The carotid arteries will often be dilated and tortuous and pulsate forcefully. The supracardiac dullness is usually increased. This was well borne out in Purks'[8] findings on dynamic dilatation of the thoracic aorta. One will often find abnormal pulsations or bruits in the interscapular region or axillae. A systolic murmur is almost invariably heard over the precordium, usually best heard at the base. A diastolic murmur of aortic insufficiency (due to bicuspid valves or endocardial change) is occasionally present. Palpation of the abdomen usually shows little or no pulsation in the aorta at that point. Likewise, pulsation is either absent or diminished in the femoral, popliteal, dorsalis pedis and posterior tibial vessels. The blood pressure in the legs may be too low to record or at least considerably less than that in the upper extremities.

Let us now consider the roentgenologic findings. In 1926 King said "Roentgenograms are disappointing." Blackford in 1928 said "Roentgenographic examination of the thorax is of value in excluding aneurysm, which has been the most common erroneous diagnosis, but the presence of aneurysm does not exclude coarctation." The earliest writers on coarctation, including Walshe,[9] Craigie,[10] Meckel,[11] and others, were well aware of the fact that erosion of the ribs is often present. They rightly attributed this to the dilatation and tortuosity of the intercostal arteries which plays such a large part in establishing collateral circulation. A roentgenogram of the chest of a case reported by Abbott in 1928 shows this erosion. It remained, however, for Railsback and Dock, in 1929, to call attention to this roentgenologic finding as being pathognomic of coarctation. Fray, in 1930, likewise emphasized this finding and also recalled other features of the roentgenographic study that are of importance. Chief among these diagnostic features are the following: (1) There is an absence of the normal aortic knob. (2) In the left postero-anterior oblique view of the chest a defect or break in continuity of the aorta is usually demonstrable. A segment of one to three contimeters in the descending arch cannot be visualized. (3) There is usually cardiac enlargement to the left. (4) The proximal or ascending aorta is usually dilated. (5) Erosion of the ribs is present. These erosions are always multiple, bilateral, and occur only on the lower margins of ribs. The sulcus is always smoothly curvilinear, never rough or angulated. There is no alteration in the adjacent bone. New bone formation does not occur and pathological fractures have not been reported.

The following case reports will serve to emphasize the chief features of clinical and laboratory studies:

Case 1.—An American housewife, aged 23 years, was first seen on September 27, 1934, complaining of shortness of breath and pain in the chest of seven years' du-

ration. Her family history and past history were essentially irrelevant.

In childhood she noticed slight shortness of breath on exertion. At the age of 16 years she entered training to become a nurse. Soon afterward the shortness of breath became quite marked and the palpitation was troublesome. General examination disclosed an elevation of blood pressure, though apparently no other abnormality. She continued her training. Two years later, shortness of breath and palpitation became so severe that she was forced to bed. She subsequently got up and by limiting her activities was able to do fairly well. For two years she has, in addition to the shortness of breath, had precordial pain typically anginal in character and with radiation down the left arm as far as the elbow.

She has consulted a number of physicians, most of whom gave her a bad prognosis. She gathered the impression that at best she had not more than a few years to live.

Physical examination showed good development and nutrition. She was over breathing slightly. Complete examination was essentially negative except for the findings listed below:

In the suprasternal notch there was an abnormal pulsation produced by a dilated and tortuous right common carotid artery. There was no tracheal tug. The thorax was well developed and nourished. Chest expansion was good and equal on the two sides. The lungs were negative. The cardiac impulse was not seen and was poorly localized on palpation. The left border of cardiac dullness measured ten centimeters from the midsternal line in the fifth interspace. There was no other evidence of enlargement. Auscultation showed the heart to be overactive. Its rate was 100 to the minute. The action was regular. The sounds were of fair quality. At the apex no murmurs were heard. Over the base, and best heard just to the right of the sternum, there was a harsh systolic murmur of short duration. This murmur was not accompanied by a thrill. There was no basal diastolic murmur. Auscultation in the interscapular region posteriorly revealed that the systolic murmur heard at the base was well transmitted through the chest. Auscultation over the right lower chest likewise revealed a systolic bruit over the lower ribs. There was no thrill at this point. Her blood pressure was 150/105. Examination of the abdomen showed a complete absence of any pulsation in the aorta. Both legs were somewhat cold. There was no pulsation in either popliteal, dorsalis pedis or posterior tibial arteries. An attempt to obtain the blood pressure in the right leg showed values too low to record.

Laboratory Studies.—Routine laboratory studies and kidney function tests showed no abnormalities. The electrocardiogram showed normal curves. An x-ray of her chest at seven feet (*Fig. 1*) showed a rounding and blunting of the apex of the heart, which appeared slightly enlarged. The right cardiac border was relatively straight. There was a complete absence of the aortic knob. The lung fields were entirely normal. At various points along the ribs on both sides in the upper and lower chest there was definite notching and scalloping characteristic of coarctation of the aorta.

Case 2.—A negro boy, aged 14 years, was seen for the first time on October 8, 1934. At that time he was acutely ill with malaria. Quinine was prescribed and the patient reported at the office on October 21 for further study.

His family history was irrelevant. He was a normal full-term baby. Development proceeded normally. There was no history of acute infections other than uncomplicated measles and whooping cough. He had always been healthy and active. His cardiorespiratory history was entirely negative until the onset of the attack of malaria mentioned above. At that time he first complained of dizziness and of slight shortness of breath.

Examination disclosed a well developed, but poorly nourished male child. General physical examination was negative except as related below: the posterior cervical glands were moderately enlarged. Both epitrochlear glands likewise showed some enlargement. The blood pressure in the right arm was 195/80, in the left arm 180/70, and in the legs too low to be recorded. The femoral pulsations were very feeble. There was no pulsation in the popliteal or dorsalis pedis arteries and

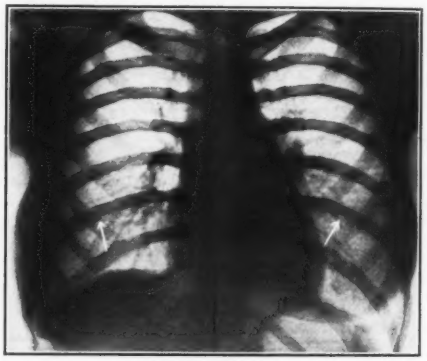

Fig. 1, Case 1

Seven-foot film of the chest showing rounding and blunting of the apex of the heart, an absence of the aortic knob, and notching of the ribs.

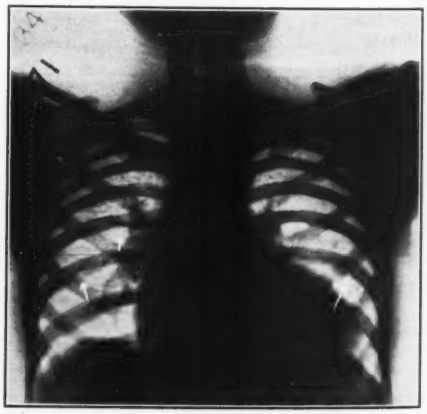

Fig. 2, Case 2

Seven-foot film of the chest showing cardiac enlargement to the left, absence of the aortic knob, increase in supracardiac shadow and marked notching of the ribs.

both feet were cold. Examination of the chest showed a very marked pulsation in the suprasternal notch. There was also a marked pulsation in the infraclavicular spaces extending well out on both sides of the chest. No abnormal pulsations were made out in the chest posteriorly. The cardiac impulse was thrusting in character and located in the sixth interspace well to the left of the nipple. The left border of cardiac dullness corresponded to the apex as observed on palpation. There was no increase in dullness to the right and supracardiac dullness was not accurately made out, though apparently somewhat widened. The heart rate was 92. Its rhythm was regular. At the apex there was a loud blowing murmur, systolic in time and transmitted well to the axilla. Over the aortic area there was a rough systolic murmur and a loud blowing diastolic murmur. Over the pulmonic area there was a rough murmur heard throughout the heart cycle and having accentuation in systole and diastole. Along the left border of the sternum, best heard in the fifth interspace, there was a loud early diastolic murmur which was high pitched and almost whistling in character. No thrills were felt. Auscultation over the upper part of the chest posteriorly revealed a long systolic murmur best heard above the spine of the capsulae.

Laboratory Studies.—Routine laboratory studies were negative. The electrocardiogram showed normal curves. An x-ray of the chest at seven feet (*Fig. 2*) showed marked cardiac enlargement, chiefly to the left and downward, a complete absence of the aortic knob, slight widening of the supracardiac shadow and marked notching of the ribs, best seen on the eighth ribs posteriorly.

DISCUSSION

The above cases both present the typical findings of coarctation of the aorta. The second case in addition has features suggesting other congenital heart lesions.

In conclusion, let us re-emphasize that coarctation of the aorta is not very rare, that its diagnosis is important and is now relatively easy. Clinically the major diagnostic feature is a discrepancy between the degree of pulsation and the level of blood pressure readings in the upper extremities and those of the lower extremities, the former showing much larger values. Roentgenographic examination of the chest will give positive diagnostic evidence in the majority of cases.

BIBLIOGRAPHY

1. Hamilton, W. F.; and Abbott, M. E.: Amer. Heart Jour., **3**:381, 1928.
2. Railsback, O. D.; and Dock, W.: Radiology, **12**:58, 1929.
3. Ernstene, A. C.; and Robins, S. A.: Amer. Jour. Roentgenol., **25**:243, 1931.
4. Fray, W. F.: Amer. Jour. Roentgenol., **24**:389, 1930.
5. Eppinger, E. C.; and Midelfart, P. H.: Amer. Jour. Med. Sci., **185**:258, 1933.
6. King, J. T.: Arch. Int. Med., **38**:69, 1926.
7. Blackford, W. K.: Arch. Int. Med., **41**:702, 1928.
8. Purks, W. K.: Amer. Heart Jour., **9**:655, 1934.
9. Walshe, W. H.: A Practical Treatise on Diseases of the Heart and Great Vessels, p. 536, London, 1873.
10. Craigie, D.: Edinbugh Med. & Surg. Jour., **11**:427, 1841.
11. Meckel, A.: Meckel Archiv. f. Anat. u. Physical, p. 345, 1827.

LUTEIN CELL CARCINOMA OF THE OVARY*

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and
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The condition we call to your attention and the case we present are in themselves of no major importance, but when studied in the light of modern knowledge of glandular hormones, they serve to illustrate something that is important, namely, the fact that some tumors may have functions. The idea or the belief that tumors may have functions is a novel one. Of course, it has long been recognized that loss of weight and eventual cachexia are unvarying accompaniments of malignancy. But the conception that specific tumors exert specific functions is of comparatively recent origin, a conception credited to Robert Meyer of Germany. There are several notable examples of this.

(1) Tumors of the pituitary gland may cause a dysfunction of the growth-controlling hormone of this gland, producing acromegaly, gigantism, obesity, or other abnormality.

(2) Adenomata of the thyroid may stimulate an overproduction of thyroxin and subsequent causation of the train of symptoms we know as hyperthyroidism.

(3) Tumors of the parathyroids may cause overstimulation of the internal secretion of these glands which, in turn, mobilizes the calcium reserve in the bones and other tissues, producing generalized osteitis fibrosa of von Recklinghausen.

(4) Tumors of the pancreas, sometimes of surprisingly small size, are known to cause hyperinsulinism and subsequent hypoglycemia, with the symptoms that this deficiency produces.

(5) Tumors of the medulla of the adrenal may stimulate the secretion of epinephrine to the point of causing arterial hypertension, and it may well be that such tumors may be an etiological factor in the production of what we know as essential hypertension. Tumors of the adrenal cortex are quite different embryologically and morphologically, and are likely to

*Read in Clinical Session, Obstetrical and Gynecological, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

cause precocity, virilism, or pseudohermaphroditism.

(6) Teratomata of the testicle stimulate the anterior portion of the pituitary gland to secrete an excess of prolan A which appears in the urine, where it has a specific diagnostic and prognostic significance.

(7) Dysfunction of the ovaries, due to tumors arising from different parts of the glands, may be presented in more than one type. (a) The best known is caused by granulosa cell carcinoma. This tumor secretes an oversupply of estrin, which leads to marked abnormalities of the menstrual function. While more common at or after the menopause, it may occur in girls as young as three, causing these children to menstruate, their breasts to enlarge, and other secondary sexual characteristics to appear. (b) Theca cell tumors of the ovary with morphology quite different but with function rather similar to granulosa cell tumor, have been observed. (c) Tumors known as arrhenoblastomata that contain cells resembling testicular tissue may lead to disappearance of feminine characteristics and assumption of masculine traits, change in conformation, amenorrhea, atrophy of breasts, mannish voice and heavy beard. It is interesting to speculate on the relationship, or possible identity, of this tumor to those arising from the adrenal cortex, since their embryological origin and their functional results are identical. (d) Tumors of lutein cells that have to do with secretion of progestin, the hormone that allegedly plays a significant role in the harmony or dysharmony of the menstrual function, may occur.

In short, many of the internal secretory glands are susceptible to tumor growths that may exert a profound influence on their respective secretions and their interrelationships. And when one enters that twilight zone that has to do with glandular interrelationships, speculation must of necessity also enter. There are so many facts and so many factors concerned. The various and perhaps varying relationships of these glands, one with another, make the situation quite complex and, in the present state of our knowledge, controversial.

Many of these tumors are amenable to surgical removal and disappearance or regression of symptoms may be expected.

The particular type of tumor presented in this paper is lutein cell carcinoma of the ovary.

CASE REPORT

Miss B. McC., aged 45, was admitted to the Medical and Surgical Hospital January 25, 1934, complaining of tumor in the abdomen.

Some of the facts of her past history may or may not be of significance. She had had no serious illness except typhoid fever at the age of 20. Her menstrual periods began at 13, came regularly at twenty-one-day intervals, lasted three days with average flow and were painless. The menopause came abruptly and without symptoms at the age of 40, five years before she was seen. There had never been any leukorrheal discharge. Up to the age of 6 she was thin and sickly. From 6 to 13 years of age she gained weight markedly, so that the other children called her "baby elephant." She probably weighed about 160 pounds at the age of 13. The year menstruation started, she began to lose weight and soon reached 135 pounds, where her weight remained stationary for about fifteen years. She then gained again gradually and the peak of 190 pounds was reached in 1930 at the age of 41. Curtailment in diet reduced the weight to 170 pounds, her weight at examination.

The time of onset of her present illness was obscure. For about two years she had had considerable lumbar backache and dull cramping pain in both sides of the lower abdomen. Three or four years prior to this time she had injured her back in an automobile accident and these pains were interpreted as after effects of this accident. The abdominal pain was accompanied by pain in the rectum, which, at times, gave the feeling of the presence of a hard substance. But for the most part pain was not a very notable symptom.

For several years prior to admission the patient thought her abdomen was larger than it should be, larger, perhaps, than her overweight would explain. However, it was only two weeks before she was seen that a hard mass was recognized. She herself feels that the tumor has been present for many years.

Associated with pain and tumor were these symptoms: lassitude, loss of strength, nervousness, moderate constipation and slight irritability of the bladder. There had been no appreciable loss of weight. There had been noticed no atrophy of the breasts, no abnormal deposits of fat, no change in voice, no excessive development of hair, nor other symptoms of defeminization.

Physical examination showed the patient to be a rather obese white woman, who did not appear acutely ill. Her skin was smooth, normal in appearance, and showed no areas of pigmentation. Her eyes were normal and pupils reacted normally to light and accommodation. Mouth, teeth and throat were in good condition. There was no enlargement of the thyroid gland or lymph nodes. The heart was normal in size and position. Its rate was regular and no murmurs were present. The blood pressure was 125 systolic and 80 diastolic. No evidence of disease was present in the lungs.

Inspection of the abdomen revealed a prominence which began just above the pubis and extended to the neighborhood of the umbilicus. On palpation this prominence was found to be a tumor mass which apparently rose out of the pelvis and filled the lower abdominal cavity as far as the umbilicus. This mass was rather firm in consistency, had a smooth surface, was moderately fixed, and was free from tenderness.

Pelvic examination showed that the tumor mass was wedged firmly into the pelvis and was more or less

fixed. No nodules were palpable. There was a suggestion of fluctuation just back of the cervix. No tenderness was present on pelvic examination.

Laboratory Examinations.—The urine showed nothing abnormal.

There were 6,300 leukocytes in the blood with 75 per cent polymorphonuclears, 40 small lymphocytes, 1 large lymphocyte, 1 eosinophil, and 1 transitional; 3,730,000 red cells with 75 per cent hemoglobin.

The preoperative diagnosis was myomata uteri.

Operation.—Under ether anesthesia a 6-inch midline incision was made. It was at once seen that there was present a large cyst which reached above the umbilicus. Several loops of intestine and omentum were found adherent. These were released. The contents of the cyst were then aspirated and its removal begun. The cyst was found densely adherent posteriorly. Deep in the cul-de-sac a hard nodule, about the size of a hen's egg, was palpable. With great difficulty this was released. The bladder was then freed anteriorly and the uterus removed supravaginally. The exposure was so difficult and adhesions were so dense that it seemed inadvisable to hazard removal of the cervix. A small area of the cyst wall was left adherent to the rectum. The rectal wall was slightly damaged, so that it seemed inadvisable to attempt removal of this portion of the cyst wall. This small portion was quite smooth and showed no papillomatous areas.

Over the surface of the cyst and to a less extent scattered over the intestines in the lower abdomen one could see small yellowish pedunculated areas about the size of bird shot and slightly larger. These areas were rather soft and had an unusual yellow color. Two or three of them were removed from the intestine for microscopic examination.

All vessels were ligated with No. 2 catgut. The round ligaments were brought down to the cervix and the bladder-peritoneum pulled over the cervix. Two penrose drains were left in the pelvis because of the rather general oozing that was present. The appendix was not removed because of the patient's condition. No nodules were felt in the liver.

The wound was closed in layers, plain catgut in the peritoneum, chromic catgut in the fascia, and silkworm gut in the skin.

The patient left the table in fair condition.

Pathological Report.—Grossly, the wall of the uterus measures 1.8 cm. in thickness. The surface of the serous covering is roughened by what appears to be the remains of adherent bands separated in the removal of the organ. Situated high in the wall of the fundus a fibroid tumor 1.3 cm. in diameter is seen. Another rounded interstitial fibroid growth 4 mm. in diameter is found situated lower down in the wall of the uterus (fundus). These tumors are well demarcated from surrounding structures.

The left fallopian tube and ovary are bound together by firm adhesions. One such adherent band, 1.5 cm. in width, extends from the surface of the ovary and tube to a large tumor mass involving the opposite ovary. Forming a part of this band of tissue are a number of small yellowish appearing tumors, one of which is definitely pedunculated. The left ovary, grayish-white in color, is quite firm and measures 3 cm. x 2.1 cm. The cut surface shows the presence of several very small cysts filled with a clear yellowish fluid. The walls of the fallopian tube are of normal thickness, and the fimbriated end is patent.

The right ovary is the seat of a cystic tumor measuring approximately 14 x 11 cm. The thickness of the wall of the cyst over the greater part of the surface is approximately 8 mm. Attached to its inner surface and projecting into the cyst cavity are two nodular masses approximately 5.5 x 4 cm. The cut surface is yellowish in color. (The contents of the cyst were not seen in the laboratory.) The outer surface of this cystic tumor of ovary shows many adherent bands, in most of which small yellowish tumors are seen. Some of these small tumors are attached by a narrow pedicle, while others are in the form of sessile growths. Some of them show a dark brownish, softer central portion. The fallopian tube is firmly attached to the surface of the ovarian growth. The walls are of about normal thickness and the fimbriated end is patulous.

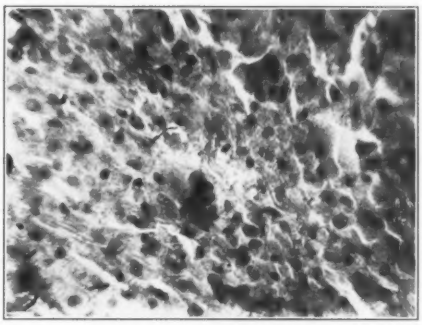

Fig. 1
Photomicrograph of section of lutein cell carcinoma of the ovary.

Microscopic sections of the above described tumors of the wall of the uterus show the usual picture of fibromyoma. Nothing of unusual interest is found in sections of endometrium.

Sections of the left ovary show sclerotic changes and the presence of small cysts lined with cuboidal epithelium. The only changes from the normal in sections of the left fallopian tube are seen in adhesions to the serous surface. The same applies to sections of the right fallopian tube.

Sections from various parts of the tumor of the right ovary and sections of the yellowish tumors in bands of adhesions described above show much the same histological picture. The sections consist very largely of large cells with clear cytoplasm grouped together in solid collections or arranged around small lumina. The resemblance of these cells to the cells of a hypernephroma is striking. A delicate supporting stroma is seen in parts of the sections studied. Very little irregularity in the size and outline of the cells is seen. A yellowish pigment is seen in the cytoplasm of some of the cells. Sections of two pedunculated tumors removed by the surgeon from peritoneum of the lower abdominal cavity show much the same picture, plus degenerative and necrotic changes in the deeper parts. These tumors are of a darker color and softer in the central portion.

Specific staining methods show the presence of lipoids in the cytoplasm of cells.

The final pathological diagnosis is (1) lutein cell carcinoma of the right ovary; and (2) uterine fibromyomata.

Sections of this tumor were submitted to Dr. A. C. Broders, of Rochester, Minnesota, and his opinion follows: "This tumor is a lutein cell carcinoma, which is, as you know, relatively rare, and is also of a comparatively low grade of malignancy. While this specific tumor bears a close resemblance to the tumor of the adrenal cortex which Dr. Walters called to your attention, it is of an entirely different nature."

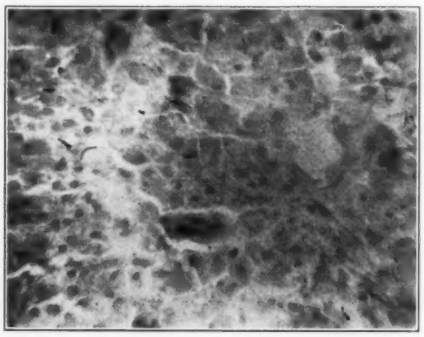

Fig. 2
Photomicrograph of section of tumor showing slight degeneration.

Subsequent History.—The patient made a good postoperative recovery and left the hospital at the end of the second week. At the end of the third week five x-ray treatments totaling 760 roentgen units each were given anteriorly and posteriorly. The factors used were 190 kilovolts, 30 ma.; distance, 50 cm.; filters, ½ mm. copper, 1 mm. aluminum.

It is now ten months since the operation. The patient has regained her weight and strength, has no pain in her abdomen or back, and feels quite well in every respect. Abdominal and vaginal examinations reveal no evidence of recurrence.

DISCUSSION

Recognition of the fact that some tumors of the ovary exert a hormonal effect has contributed much to our understanding not only of their origin from certain cellular structures, but also has made possible a clearer conception of the gross and microscopic pathologic features. More than that, careful consideration of the significance of the endocrinology of these tumors can be made to serve as a valuable guide to a clinical diagnosis of the case.

Hormonal proof that ovarian tumors arising from granulosa cells of the graäfian follicle and probably also others having their origin from cells of the theca interna, elaborate a secretion that is estrogenic in its effects, has been shown in cases reported by a number of prominent investigators.

The history of the case here reported offers at least a strong suggestion that the ovarian growth, a lutein cell carcinoma, exerted a distinct hormonal effect. This, we think, is shown by the fact that following a normal menstrual history since the patient was 13 years of age there was abrupt cessation of the periods at 40 years of age, a time which corresponds very closely with the first indication the patient had of the presence of tumor formation in the pelvis.

A careful consideration of the gross and histologic features, and the criteria upon which the histologic diagnosis rests, is of fundamental importance in dealing with any form of neoplastic disease. This becomes even more important in the study of rare cases in which the pathologic basis has not been well established. Fortunately, in lutein cell carcinoma of the ovary the gross picture is sufficiently distinctive to make recognition comparatively easy at the time of operation. It is true, of course, that tumors in this region, with an origin from extrarenal adrenal rests, must be taken into consideration. Histologically lutein cell carcinoma is even more striking and characteristic in its close resemblance to the cortical tissue of the adrenal, and to some tumors arising from the adrenal rests.

LITERATURE

Scant or no attention is paid to this type of tumor in the text-books. Kelly refers to a tumor "which seems to have originated in the lutein cells, hence the name luteoma."

Graves says:

"A comparatively new malignant tumor of the ovary is the luteoma. Glynn has produced evidence that most of the tumors formerly described as hypernephroma were in reality neoplasms of the corpus luteum. He asserts that relics of the suprarenal cortex are often found near the ovary in the broad ligament, but never in the ovarian substance. Hypernephromata that involve the ovary therefore are invasions from without. The luteomata, though resembling hypernephromata, differ from them in a number of ways: histologic, chemical, and otherwise. Clinically, they do not produce the well-known sign of 'suprarenal virilism,' a point of differentiation strongly emphasized by Glynn and more recently by Wolfe.* * * Their individuality has not been conclusively established."

Stout, in his "Human Cancer," mentions the malignant luteinomas and states that they are very rare; however, he confusingly uses the term synonymously with granulosa cell tumors.

Ewing presents a clearer conception of the condition and says he has observed two forms of these tumors. He concludes that "while positive proof of the lutein cell origin has not been furnished, the gross appearance of the rounded yellow tumors and their peculiar structure render such an origin probable."

Other than these, text-books for the most part make no mention of this condition.

All references to tumors originating in corpus luteum mention that Rokitanski in 1859 reported a case in which diagnosis was made without microscopic confirmation. It is altogether possible that the yellow color of the tissue might justify such a diagnosis, provided the observer kept the condition in mind.

In 1895, Voight described a tumor of the left ovary the size of a man's head in a woman of 30 years, nine months pregnant with twins. He called this tumor "perithelioma" and presumed that it originated from the corpus luteum because its cells resembled the large cells of that structure.

Schaller-Pfoerringer reported a tumor of the right ovary in a 32-year-old woman. The tumor consisted of small cysts, the walls of which were formed of a thick layer now of round cells, now of cubic cells, with clearly staining nuclei and diffusely staining protoplasm. A few fat globules were present in the protoplasm. The author interpreted these cells to be malignant degeneration of corpus luteum.

Michelozzi and Santi observed a case which they called "alveolar sarcoma." The center of the tumor presented an alveolar structure with large cells of varying shape, rich in protoplasm and which in the author's opinion were lutein cells.

Grudsjew reported a case in a patient of 60 years operated upon for cystic degeneration of the ovaries. Seventeen months later she developed an omental tumor microscopically shown to be a round cell sarcoma. The author believed the tumor to have its origin in the theca folliculi, which he believed formed lutein cells after cessation of ovarian activity. The name given to the neoplasm by Grudsjew was "sarcoma ovarii cysticum luteinocellulare."

In 1922, Itchikawa described a case of bilateral ovarian tumor with extensive metastases in a woman of 34 years. Staining with Sudan III demonstrated the presence of lutein cells. The origin of the tumor was believed to be the internal theca. He called the tumor "sarcoma ovarii."

In 1925, Tiesenhausen removed a tumor the size of an apple from a 40-year-old woman. In 1923, she noticed frequent recurrence of her menstruation and a painful sensation in her left groin. This gradually changed to continuous severe bleeding. Five months after the operation the patient had fully recovered and menstruated every four weeks for five to seven days. The tumor proved to be a cyst with thick walls, consisting of a yellow substance with large, round and egg-shaped cells with a rather colorless nucleus and vacuolated protoplasm. A large amount of lipoids was present in these cells. The author called the tumor "luteinocelluloma" and is of the opinion that the tumor developed from the menstrual corpus luteum and caused hemorrhages, which did not cease until the tumor had been removed.

In 1927, Lewinsky reported a case in a hitherto healthy woman of 40. She had always menstruated regularly, the last time forty-two days before operation. Fifteen days after the period she had uterine hemorrhage of two weeks' duration. A diagnosis of tubal pregnancy was made. A tumor the size of an apple was found in the right ovary and one the size of a cherry in the left. Both tumors were made up of large epithelial cells with porous protoplasm and yellow nuclei. Mitotic figures were present and in some cells a fine yellow pigment was observed. Metastases occurred eighteen months later.

Wolfe's case was an unmarried woman of 21. Pain in the right lower abdomen and irregular menstruation were the complaints. For two months prior to operation she had menstruated every two weeks for five to six days. The right ovary was the site of a tumor, measuring 15 x 10 x 5 cm. The left ovary was not much enlarged, but contained a small tumor histologically similar to that on the right side. No subsequent history of this case was obtainable.

Cosacesco, Draganescu, Georgescu and Dinischiotu reported a case as luteinoma of the ovary in a woman 34 years old. She had had amenorrhea for eight years, masculine conformation of the face and body and hypertrichosis. A tumor the size of a large peach was removed from the left ovary. One month after the operation menstruation reappeared and thereafter she menstruated regularly. At the end of two and one-half years feminine characteristics had returned and hair had practically disappeared from the face. The symptoms of this case are very suggestive of those due to the tumor called arrhenoblastoma of Meyer and disappearance of symptoms suggests a similar diagnosis. Their photomicrographs for the most part also resemble this condition, but there is one picture which does resemble lutein carcinoma. The cells of the latter are large with irregular outlines. The nuclei are dark and in some cases multiple. The protoplasm of part of the cells shows vacuoles. It is conceivable that this tumor may from a clinical and microscopic standpoint show characteristics of both the tumors mentioned.

The most comprehensive article on this condition is by Lissowetsky and much of the literature was summarized by him in 1933. He reported the case of a previously healthy woman of 46. She began to menstruate at 15 and no mention is made of any menstrual abnormality. She had had two healthy children. Severe pain in the lower abdomen and back of three weeks' duration was the only symptom. A diagnosis of bilateral ovarian tumor was made. Tumors were found in both ovaries and both ovaries and tubes were removed along with a cherry-sized metastasis in the broad ligament. The patient developed multiple metastasis and died five months later.

Both ovaries were the site of tumors about 7 x 5 cm. The tissue was firm in consistency and yellow in color. Microscopic examination showed typical large round cells with dark nuclei and vacuolated protoplasm, rich in lipoids. Many of the cells contained a yellowish pigment and many mitotic figures were in evidence. In addition what he considered primordial follicles and corpora albicantia were present. In areas where the yellow pigment was abundant a structure comparable to corpus luteum with its characteristic three layers was observed.

The yellow coloring of the growth and the peculiar arrangement and morphology of the cells led Lissowetzky to believe the tumor originated in the cells of the yellow body.

CONCLUSIONS

(1) A case of lutein cell carcinoma of the ovary is reported.

(2) There is much difference of opinion and much confusion about the classification and the identity of tumors arising from the corpus luteum. Many names, such as luteoma, lutienoma, lutein cell carcinoma, are used, apparently to designate the same condition.

(3) Lissowetzky must have appreciated this confusion when he said that these tumors should be considered from a physical, chemical, morphological and functional standpoint.

(4) There is reason to believe that the tumor is more frequent than might be supposed from the small number of reported cases.

(5) A careful study of photomicrographs of reported cases reveals much similarity in morphology, yet there are discernible differences which raise the question whether these tumors may not be somewhat varied in their histology.

(6) Most of these tumors manifest a low grade of malignancy. Deep x-ray therapy should be a useful adjunct in the prevention of recurrence.

(7) In the light of our newer knowledge of the hormonal function of the ovary, lutein cell carcinoma may play an important role in producing progestin and in inhibiting the menstrual function.

REFERENCES

Cecil, J. S.: Hypertension, Obesity, Virilism and Pseudohermaphroditism. J.A.M.A., **100**:463, Feb. 18, 1933.
Cosacesco, A.; Draganescu, S.; Georgescu, M.; and Dinischiotu, G. T.: Luteinome de l'ovaire: contribution anatomo-clinique a l'etude de virilisme ovarian. Presse med., **39**:1264-1267, Aug. 26, 1931.
Ewing, J.: Neoplastic Diseases, p. 628, 1928.
Glynn, E.: Comparison Between Ovarian Hypernephroma and Luteoma and Suprarenal Hypernephroma. Jour. Obst. & Gyn. Brit. Emp., **28**:23, 1921.
Graves, W. P.: Gynecology, p. 476, 1928.
Grudsjew: Arch. f. Gynak., **70**:445, 1903.
Itchikawa: Zit. nach Jber. Gynak., p. 36, 1925.
Kelly, H. A.: Gynecology, p. 749, 1928.
Lewinsky: Eine proliferiende Geschwulst des gelben Korpes. Ukrain. Med. Visti, 1927.
Lissowetzky, V.: Zur Frage des sogenannten Carcinom des Corpus Luteum. Virchow's Arch. f. path. Anat., **288**:297, 1933.
Melnick, P. J.; and Kanter, A. E.: Theca Cell Tumors of the Ovary. Amer. Jour. Obst. & Gyn., **27**:41, Jan., 1934.
Meyer, R.: The Pathology of Some Special Ovarian Tumors and Their Relation to Sex Characteristics. Amer. Jour. Obst. & Gyn., **22**:697, Nov., 1931.
Novak, E.: Granulosa Cell Ovarian Tumors as a Cause of Precocious Puberty. Amer. Jour. Obst. & Gyn., **26**:505, Oct., 1933.
Stout, A. P.: Human Cancer, p. 423, 1932.
Taylor, J. M.; Wolfermann, S. J.; and Krock, F.: Arrhenoblastoma of the Ovary. Surg., Gyn. & Obst., **46**:1040. June, 1933.
TeLinde, R. W.: Granulosal Cell Tumors of the Ovary and Their Relation to Postmenopausal Bleeding. Amer. Jour. Obst. & Gyn., **20**:552, Oct., 1930.
Tiesenhausen, M.: Ein Fall von maligner entartung einer Luteincyste. Samml. wissenschaftl. Arb. Aus den Grenzgeb. der Kynak., p. 216, 1925.
Wolfe, S. E.: Ovarian Luteoma with Case Report. Amer. Jour. Obst. & Gyn., **13**:575, May, 1927.

PROPHYLAXIS OF SHOCK*

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It is fully realized that the possibilities of discussion of this subject are practically unlimited and that the points presented are debatable. However, I have found the regime herein described to be most helpful in carrying my patient through the ordeals of surgery.

Definition.—Cutler describes shock as "but a symptom complex resulting from a rapid diminution in the circulating blood volume below the point of circulatory efficiency." It has generally been recognized that the one outstanding feature of this is the lowering of blood pressure, accompanied by a thready rapid pulse and cold clammy state of the skin.

The mechanism of the production of shock in the absence of severe hemorrhage seems to be, as shown by the experiments of Krogh, that great areas in the capillary bed are closed to circulation, with resulting stagnation and concentration. This may account for the loss in blood volume. This same concentration of blood in the capillary beds may be seen after severe hemorrhage, and hence is an expression of the element of shock added to the direct loss of blood. Robertson and Bock have shown that the blood pressure in a given case is inversely proportional to the disproportion in concentration between capillary and venous blood. This viewpoint that shock is a symptom complex due to diminution of the circulatory blood volume explains many experimental and clinical facts. Within limits vasoconstriction and fluid reserves of the body compensate for loss in circulating fluid, and no symptoms arise. Beyond this the pulse rate rises in an endeavor to compensate and the blood pressure begins to fall. Should the loss of blood volume continue, a critical point is reached beyond which the inadequacy of the circulation further damages the capillary circulation, with the formation of a vicious circle; which, if not broken rapidly, terminates fatally.

Types.—Primary shock designates the state

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of collapse associated with a low blood pressure that may follow immediately after injury. This is found frequently in operative work, especially where extensive exploration of the peritoneal cavity is performed. If this manipulation is not too extensive the pressure will rise again. Prolonged manipulation with undue roughness or extensive hemorrhage may result rapidly in death from primary shock. In the first case it would be due to dilatation of large capillary beds and the passage into these areas of large quantities of one's volume of blood, bleeding to death into one's own capillaries.

The most common type of shock, secondary, appears an hour or more after trauma. It is this type with which the surgeon is frequently confronted. There is considerable discussion as to the mechanism of production. It is hardly possible entirely to prevent primary shock; and extensive primary shock predisposes to secondary shock. Therefore, it seems that anything which decreases the former is a prophylaxis against the latter.

Causes.—The mental attitude of the patient may mean the difference between success and failure in all branches of medicine and surgery. This is too frequently forgotten in preparation of patients for operative work. The effect of emotional stress upon the gastro-intestinal tract and secondarily the vasomotor system with signs of shock has been observed following extreme fright or other severe emotional upsets.

In the operative procedure prevention of stimulation to the central nervous system lessens the damage to the sympathetic system. Cannon has emphasized that cessation of peristaltic movements is due to stimulation of the central nervous system; also, following such stimulation vasoconstriction occurs, followed by local vasodilatation. This seems to agree with accepted theories as to production of secondary shock.

Local manipulation of tissues probably plays the greatest role in etiology of shock. Gentleness of touch, sharp dissection of tissues, moderate use of packs and retractors, and prevention of hemorrhage are essential factors in satisfactory results.

It is necessary that adequate fluid balance be present. Preoperative dehydration from lack of fluids or excessive purgation predisposes to shock.

Treatment.—It may be assumed from the foregoing that the prophylaxis against shock begins in the preoperative preparation. No preliminary purgation is used, but instead a normal bowel movement is desired 24 hours before operation. This may have been assisted by a mild laxative. During this 24-hour period fluids, high in carbohydrates, are pushed so that a minimum of 3,000 c. c. have been taken. Water is taken by mouth until one hour before operation. Twelve hours and two hours prior to operation cleansing saline enemata are given. This routine is used in the majority of elective cases. The patient enters the hospital at least 12 hours prior to operation and receives the indicated local preparation. A good night of sleep is insured by use of sedatives, usually a barbiturate, at 8 P. M., repeated at the end of two hours if necessary for sleep; also two hours before operation. One hour before operation a hypodermic containing morphine sulphate, grains ¼; atropine sulphate, grains 1/150; and hyoscine, grains 1/200, is given subcutaneously. This dosage is modified to suit the individual case. The patient passes into an amnesic state of mild hypnosis, but with no severe depression of respiratory centers. Immediately upon reaching the operating table analgesia is produced by the administration of nitrous oxide and oxygen with carbon dioxide as indicated. This is done immediately in order that the patient may not become aroused and excited during the final preparations and the production of local nerve block. If excitement occurs more general anesthesia is necessary for relaxation.

After the patient is prepared finally and draped, the local field is thoroughly blocked with a cocaine derivative (nupercain 1:2000) solution. This serves to lessen the stimulation of the central nervous system, permits performance of the operation under analgesia, prolongs the anesthetic action locally six to eight hours, and thus tides over the extremely painful postoperative period. Frequently patients pass through convalescence with no discomfort, requiring no postoperative narcosis. If narcotics are required, the first is administered about six hours after operation, and rarely more than one grain of morphine is given in the entire

period. The value of the procedure is not measured by the failure to use narcotics, but by the fact that pain is not sufficiently severe to require them. This seems to be a factor in secondary shock.

Ten to 15 minutes after blocking the local field the operation is begun. At this point the cardinal causes of shock must be recalled. Sharp dissection of tissues, rather than blunt tearing, must be done. Careful hemostasis to control loss of blood is essential. Gentleness in handling the parts is necessary. The difference in the degree of roughness is that shown by handling the most delicate tissue paper and heavy wrapping paper. All packs should be warm and placed delicately. Retraction when needed must be moderate and gentle. Ample incisions are far better than extreme traumatization for exposure.

After closure of the peritoneum and fascia the anesthetist begins administration of oxygen with sufficient carbon dioxide to stimulate deep respirations, so that by the time the incision is completely closed the patient may be aroused sufficiently to talk, but remains entirely amnesic. Rarely is any ether necessary for relaxation. If it is needed the amount is very small and only for a short time during some intricate portion of an operation.

In transfer from the operating room it is essential that body temperature be maintained and that the postoperative bed be warm for reception of the patient. In all major cases immediately a hypodermoclysis is started. This contains, as a minimum, normal saline 1,000 c. c., glucose, 25 grams, and is followed by the administration of 10 units of insulin. Further administration of fluids is governed by the type of care and the progress postoperatively. In the average elective case fluid balance can be maintained through oral administration after six hours. Narcotics are used as needed for pain for a period of 48 hours. Should nausea be present all fluids are withheld by mouth and given subcutaneously as indicated.

SUMMARY

By observing the principles of the above routine the patient leaves the operating table with only a slight rise in pulse rate, normal body temperature, and little change in blood pressure. He is awake and several hours of post-anesthetic reaction do not follow. Using the above principles, with omission of nerve block, it is necessary to give deep anesthesia for relaxation, and my patients show a decided difference in immediate postoperative condition and subsequent course. This may be due more to light general anesthesia than to the use of nerve block. I am not in a position to pass on the theoretical etiology, but I do know that with the use of local nerve block I can carry my patients through procedures with less evidence of shock than without its use, even though all the other above principles are observed.

In 60 laparotomies the difference in pulse rate preoperatively and postoperatively (using the above principles) was 14 beats per minute faster. At the end of three hours it was 9 beats per minute faster; and at the end of six hours it was 8 beats per minute faster; and at the end of 12 hours, 6 beats.

In 28 laporatomies the blood pressure showed a fall of 10 mm. of mercury immediately after operation. At the end of three hours there was a fall of 10 mm. of mercury; at six hours, a fall of only 2 mm., and at 12 hours the average had returned to normal. The average blood pressure was 115 mm. of mercury.

CONCLUSIONS

(1) Loss of body heat, dehydration and hemorrhage are known causes of shock.

(2) Damage to the central nervous system, both psychic and somatic, seems to be a factor in the production of shock.

(3) The routine as outlined tends to lessen shock.

(4) Local nerve block with a cocaine derivative (nupercain) lessens damage to the central nervous system, allows relaxation with minimal anesthesia, and prolonged freedom from pain in the postoperative period.

(5) Prophylaxis of shock begins at the time that a diagnosis is made, and continues through the operative and postoperative course.

THE USE OF HIGH PROTEIN, LOW CALORIC, ACID ASH DIET IN OBESITY*

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In the treatment of obesity a certain residuum of patients remains in whom dietary measures and endocrine drugs have proven unavailing; who do not belong under either the purely dietary group or the endocrine group. In some of these a certain point may be reached in the loss of weight beyond which no care on the part of the patient, no dietary changes, and no attempts at endocrine substitutions are followed by further weight reduction.

It has long been recognized that one element in the maintenance of weight is the ingestion of an unnecessary amount of water. There is some evidence to show that unneeded quantities of water may be stored in the adipose tissue from which it is conceivable it may under circumstances be difficult to release. Ordinarily the restriction of water-intake is followed by marked loss of weight in the early periods of treatment, much too much to be attributed to loss of adipose tissue, in the time which elapses. In other instances such early marked loss of weight is conspicuously absent; this has long remained unexplained. A comparison of the two groups suggests that with the restriction of water-intake, water from the tissues is available for the usual physiological purposes to maintain the ordinary output in the first group, and not in the second.

The factors which influence water balance include the well-known cardiac and renal conditions and the acid-base balance. Water retention due to disturbance in the last factor may be diminished by the administration of hydrochloric acid, ammonium salts and other electrolytes leading to an acidosis. Recent investigations[1 2 3 4] have shown the influence, in the retention of tissue fluids, of the blood serum protein levels on the serum osmotic pressure, especially the diminution of the serum albumin fraction. The greater protein content of plasma in comparison with tissue fluids determines a greater colloid osmotic pressure in the blood vessels and a consequent flow from the tissues to the blood stream. A low plasma protein level is accompanied by a reversal of the usual ratio of 2:1 of albumin to globulin. The globulin molecule being the larger, the colloid osmotic pressure falls and permits a flow of fluid into the tissues with its eventual accumulation. Barker[5] has shown experimentally and clinically that in the presence of such a potential condition of edema, sodium chloride causes storage of water in the tissues, which may slowly be reduced by the withdrawal of the salt from the dietary intake. In the same series of investigations he showed that potassium chloride promotes loss of water from the tissues. When in the presence of actual edema sodium chloride is entirely or largely withdrawn and replaced by potassium chloride a prompt diuresis ensues, followed by diminution of the edema with accompanying loss of weight. It has also been shown by Barker[5] and others that the basic radical rather than the acid radical is the portion of a salt which influences the water balance in the tissues. In other words, it is the sodium ion and the potassium ion rather than the chloride which influences the water balance. This has also been shown by Shelburne and Egloff.[6] It therefore follows that in incorporating modifications of the mineral intake into a diet for the purpose of diminishing water retention in the tissues sodium salts of all kinds should be reduced as far as may be feasible, the chief one of these that is easily controllable being sodium chloride. At the same time potassium salts should be increased, with active substitution of potassium chloride, which may be partly done by using it as a substitute table salt.

In an unpublished communication Rusk[7] has applied these observations to the control of ascites and edema in a case of hepatic cirrhosis and obtained complete disappearance of both over a period of nine months. He was encouraged by this experience to apply the method to refractory cases of obesity, the results of which he publishes in the *Journal of the Missouri State Medical Association* for October, 1934.

On the basis of the foregoing observations and reasoning, a diet has been constructed for those cases of obesity which for some unexplained reason display a definite water retention and consequent failure to lose weight with the ordinary restriction in water-intake and the other restrictions of an obesity diet. Such a diet should embody the usual principles of a low caloric, low water-intake. In order to avoid the develop-

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ment of hypoproteinemia as an additional factor in the water retention in obese individuals it is important that a high protein intake be provided. The usual low calory obesity diets have often erred in this direction and may be the occasion for failure to obtain loss of weight.

With a high protein intake, both carbohydrates and fats must be low to obtain a low caloric diet, and this is secured by substitution of green vegetables and fruits. Both of these must be chosen to secure a maximum of potassium salts and a minimum of sodium salts. The most important class of foods to be avoided are the citrus fruits, which both contain sodium salts and burn to an alkaline ash. Likewise other sodium salts should be avoided, as sodium bicarbonate in cooking, as a drug (in medicines), and in mineral waters. On the other hand, vegetables and fruits which burn to an acid ash should be accentuated, including those containing benzoic acid. A diet of this sort burns to an acid ash, which, there is evidence to show, reduces the likelihood of water retention.

As little sodium chloride should be used in cooking as possible and the quantity so reduced should be replaced by potassium chloride. This may be used in 5 gram (one teaspoonful) total daily doses, and in many instances proves to be a fairly palatable substitute in providing a salty taste to the food. For this purpose it may be conveniently used from a salt-shaker, the daily dose being filled in each day and any unused remainder dissolved in water at the end of the day, and taken as a dose of medicine.

Toxic effects of potassium should be carefully watched for. However, Barker and others have found no evidence of potassium storage and none of the ordinary depressive symptoms of potassium poisoning. In fact, depression is strikingly absent, in contrast to that which occurs when an acidosis is produced by ammonium salts or

Table 1

HIGH PROTEIN, LOW CALORIC, ACID ASH DIET, WITH LOW SODIUM, HIGH POTASSIUM INTAKE

Breakfast

1 serving fruit from Group 3
2 eggs
1 slice whole wheat bread 3½x2 5/8x½ inches
Coffee with saccharin and 2 tablespoons skimmed milk if desired

Lunch

Choice of:
Veal cutlet, one piece 6x4x½ inches, or 2 veal chops, or lean steak, one piece 4x3x¾ inches, or 2/3 cup ground lean beef, or 2/3 cup sweetbreads, or calf liver 4½ slices 2x3x¼ inches, or 3 pair frog legs (large), or 1½ pieces fish 4x3x½ inches. Broil these meats with mineral oil
1 serving of vegetable from Group 1

*Salads**

(1) Hard cooked egg (one)
(2) Cottage cheese ¼ cup
(3) Vegetable salad from Group 1. If this salad is selected, add ¾ cup broth to this meal
1 serving fruit from Group 2
3/4 cup skimmed milk or skimmed buttermilk

Dinner

3/4 cup broth or jellied broth
Choice of:
Roast veal, lean beef, chicken, turkey or lamb, 2½ slices 4x4x⅛ inches
1 serving vegetable from Group 1
Vegetable salad from Group 1 with 3 lettuce leaves and mineral oil dressing
1 serving fruit from Group 2
3/4 cup skimmed milk or skimmed buttermilk

Approximate food value:

C	P	F	Cal.
60	100-120	40	1050

All foods prepared without salt and no salt with meals.
Potassium chloride 5 grams (1 teaspoonful) in salt shaker as salt substitute.
Fluids limited to 6 glasses daily, including coffee, *etc.*

*Serve salad on 3 lettuce leaves with mineral oil dressing. Make dressing by using your favorite French or mayonnaise recipe, substituting mineral oil for salad or olive oil, and potassium chloride for table salt.

Table 1-A

GROUP 1

5 fresh asparagus tips
1/3 cup fresh string beans
Scant 1/2 cup beet greens
2/3 cup broccoli
Scant 2/3 cup brussel sprouts
Full 3/4 cup shredded raw cabbage
1/3 cup cooked cabbage
Full 1/2 cup cauliflower
1/2 cup cooked celery
3/4 cup raw celery
1/2 cup sliced raw cucumber
1/4 small head lettuce
3 mushrooms 1 3/4 inches in diameter
8 radishes 3/4 inch in diameter
Scant 1/2 cup cooked spinach
1/2 cup summer squash
3 slices raw tomatoes 1/2 inch thick, 2 1/2 inches in diameter

GROUP 2

3 apricot halves, canned without sugar
1 small fresh apricot
1/3 cup blackberries, canned without sugar
1/4 cup blueberries, canned without sugar
1/3 cup cubed cantaloupe
Scant 1/2 cup cherries, canned without sugar
2 figs, canned without sugar
Scant 1/4 cup grapefruit sections
Scant 1/4 cup orange sections
1 large peach half, canned without sugar
Scant 1/3 cup sliced fresh peaches
1 large pear half, canned without sugar
Scant 1/4 cup pineapple, canned without sugar
1/3 cup fresh pineapple
1/4 cup fresh black raspberries
1/3 cup red raspberries, canned without sugar
Scant 1/2 cup fresh red raspberries
Scant 2/3 cup cooked rhubarb
1/2 cup fresh strawberries
Full 1/2 cup cubed watermelon

GROUP 3

1/2 medium apple
1/3 cup unsweetened applesauce
7 apricot halves, canned without sugar
2 small fresh apricots
2/3 cup blackberries, canned without sugar
Full 1/2 cup blueberries, canned without sugar
2/3 cup cubed cantaloupe
3/4 cup cherries, canned without sugar
10 fresh cherries
3 figs, canned without sugar
1/3 cup seedless grapes, canned without sugar
1/4 cup fresh grapes without seeds
2 large peach halves, canned without sugar
Full 1/2 cup sliced fresh peaches
2 pear halves, canned without sugar
2/3 cup diced fresh pineapple
1/3 cup pineapple, canned without sugar
1 fresh plum 1 3/4x1 3/4 inches
Full 1/2 cup fresh black raspberries
2/3 cup red raspberries, canned without sugar
Full 3/4 cup fresh red raspberries
1 cup fresh strawberries
1 heaping cup cubed watermelon

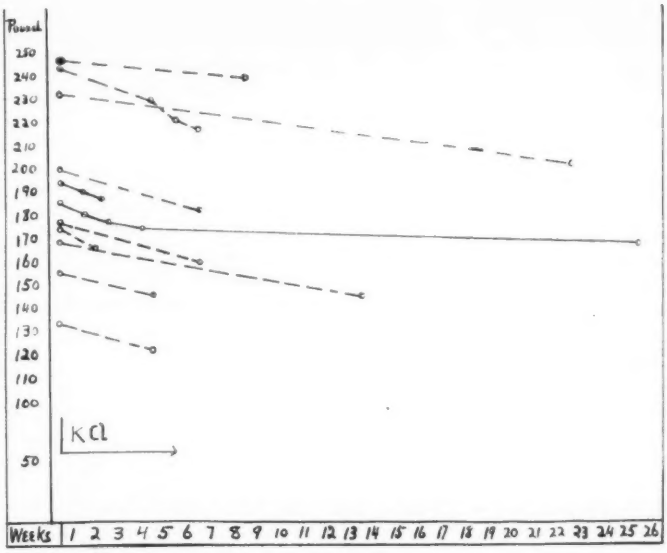

Chart 1
Loss of weight on high protein, low caloric, acid ash diet with substitution of potassium chloride for sodium chloride.

other means. No significant changes in either sodium or potassium values in the blood were found by Barker in his studies on cardiac and renal edema; no estimates were made of these values in tissue fluid.

This method may become useful in elderly obese cardiacs in whom adequate exercise is impossible. In such individuals obesity, coupled with lack of exercise, often proves a vicious circle. Harrison, *et al.*,[8] have found a marked diminution of potassium salts in the skeletal muscles in cardiac decompensation. The feeding of potassium chloride, together with an otherwise appropriate diet in such cases, may provoke a water loss sufficiently great materially to improve not only the obesity, but the degree of cardiac compensation. A similar application may be made in the obese presenting renal factors.

As a result of these considerations a diet scheme is herewith suggested. It should, of course, remain elastic and be adjusted to the individual. It contains 100 to 120 grams of protein, 60 grams of carbohydrate, and 40 grams of fat, totaling 1,050 calories. The reduction in fat may be compensated for by using a mineral oil salad dressing. The fats may also be kept low by broiling meats with mineral oil, if this can be tolerated by the patient. The total fluids ingested in 24 hours should be limited to the equivalent of 6 glasses (each approximately 6 ounces); this should include all fluids taken with meals or otherwise.

DISCUSSION

This diet has been applied in a group of cases in which every other means probably available had been instituted without success. The rate at which weight has been lost has, in the majority of cases, been strikingly uniform. This is demonstrated graphically in the following chart, in which, with few exceptions, the lines are remarkably parallel. I am indebted to Dr. Rusk for permission to plot the curves of his cases, in addition to my own.

In addition to the loss of tissue fluid and to diuresis, there is a satisfaction of hunger and a feeling of well-being which has been absent on previous diets. There is frequently, too, a disappearance of fullness about the hands and ankles which is obvious to the patient. Because of the sense of general well-being it has been possible to continue the diet without complaint on the patient's part.

CONCLUSION

A high protein, acid ash diet, low in sodium salts, with the substitution of potassium chloride, offers a method of preventing water retention in obesity, and thereby facilitates loss of weight in true proportion to the caloric intake.

BIBLIOGRAPHY

1. Barker, M. Herbert; and Kirk, E. J.: Experimental Edema (Nephrosis) in Dogs in Relation to Edema of Renal Origin in Patients Arch. Int. Med., **45**:319, March, 1930.
2. Youmans, John B.: Endemic Edema. J.A.M.A., **99**:883, Sept. 10, 1932.
3. Hartman, Alexis, et al.: The Use of Acacia in the Treatment of Edema. J.A.M.A., **100**:251, Jan. 28, 1933.
4. Herrmann, George; Stone, C. T.; Schwab, Edward H.; and Bondurant, W. W.: Diuresis in Patients with Congestive Heart Failure. J.A.M.A., **99**:1647, Nov. 12, 1932.
5. Barker, M. Herbert: Edema as Influenced by a Low Ratio of Sodium to Potassium Intake. J.A.M.A., **98**:2193, June 18, 1932.
6. Shelburne, S. A.; and Egloff, W. C.: Experimental Edema. Arch. Int. Med., **48**:51, July, 1931.
7. Rusk, Howard A.: High Protein and High Potassium Diet in the Treatment of Obesity. Jour. Mo. State Med. Assn., **31**: 390, Oct., 1934.
8. Pilcher, Calhoun, Cullen, and Harrison, T. R.: Studies in Congestive Heart Failure: Potassium Content of Skeletal Muscle Obtained by Biopsy. Jour. Clin. Invest., **9**:191, Oct., 1930.

EFFECT OF DIETARY CHANGES UPON URINARY REACTION*

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Twenty years ago Blatherwick,[1] of the Sheffield Laboratory of Physiological Chemistry, suggested that a practical therapeutic application might be made of the fact that certain fruits and vegetables have an excess of base-forming elements, making it possible to use them like sodium bicarbonate and citrate in rendering the urine less acid. Much has been written since about the foods which are base-forming and those which are acid-forming, but the therapy with food in relation to the composition of the urine has only been approached from the acid side. Within the last few years acid-producing diets have been proposed for the treatment of at least three diseases, namely: epilepsy, pyelitis, and most recently, bronchial asthma.[2]

I have seen the good effect of changing the reaction of the acid urine in dysuria due to cystitis, in acute pyelitis, also, by giving a sodium salt, the bicarbonate or citrate. One can get just as favorable results through the influence of an alkali-producing diet. Another clinical condition known especially to pediatricians is the ammoniacal dermatitis of the buttocks, common in the artificially-fed infant whose diet closely approaches or exceeds a quart of cow's milk daily. Dermatitis of this type is never found in the infant which is entirely breast-fed. The condition can be quickly cured by basic additions and acid-forming reductions in the diet. There are no doubt other disturbances in which changes in the acid-base dietary will be found useful.

This year we have been measuring the range of the pH of children's urines, and comparing the readings with the type of diet. The technic is standardized. Several daily specimens are collected from the child. The voided or catheterized urine is at once placed in a container, preferably in a test tube or narrow beaker rinsed with distilled water, to free it of soap and the hydrant water in which it had been washed. The urine is at the earliest opportunity overlaid with toluene to protect it from exposure to air. The pH is determined at a convenient hour during the day by measurement with the electrometric hydrogen ion potentiometer, using the quinhydrone electrode.*

I wish to show in abridged form some figures regarding diets and hydrogen ion concentrations of the resultant urine.

Table 1

URINARY pH IN NEWLY BORN INFANTS
DIET BREAST MILK

Age Day	No. Infants	pH	Age Day	No. Infants	pH
1	3	5.79	8	14	6.45
2	2	5.65	9	17	6.31
3	9	6.06	10	15	6.47
4	14	5.96	11	15	6.279
5	19	6.23	12	12	6.57
6	20	6.25	13	8	7.08
7	16	6.42	14	5	6.83

The pH of the urine was determined in newly born infants whose diet consisted of breast milk, with the addition of water given between nursings. It is not probable that the small amount of water affects the reaction of the urine, certainly not the total amount of acid secreted.

The urine is slightly more acid as a rule during the first four days in the period of low intake on colostrum; then it varies between 6.23 and 7.08. The figures show that there is a tendency toward a higher value of pH during the progress of the newly born period. All the urine possible was secured on each day, and the average of all taken for that day of life. The graphic representation of the above values for pH follows:

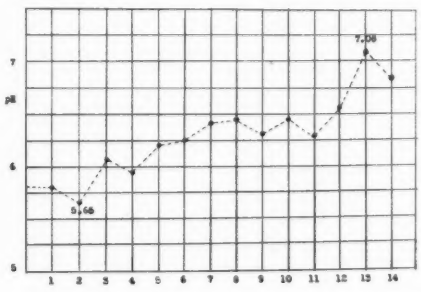

Chart 1

Curve of urinary pH during first fourteen days of life on breast milk.

*Read in Section on Pediatrics, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

*From the Department of Pediatrics, School of Medicine, University of Kansas. The writer acknowledges the assistance of David Loy, A.B., M.A., of the Medical School, and George Herrman, M.D., Resident, in the many details, including the technical determinations.

*The apparatus used for testing the hydrogen ion concentration of the urines is the Indicator No. 7654, an electrical measuring instrument, a small compact potentiometer designed for this purpose. It is made by the Leeds & Northrup Company, of Philadelphia.

Table 2

TYPICAL pH OF 24-HOUR URINE FROM A NEWLY BORN INFANT ON BREAST AND LACTOSE SOLUTION

Age Day	pH	Age Day	pH
1	5.9	6	6.4
2	6.0	7	6.38
3	5.94	8	7.0
4	6.0	9	7.4
5	6.42	10	7.38

The pH of the 24-hour urine in a single typical infant shows the upward curve of the pH much the same as the composite curve just shown. It rises fairly constantly daily and here reaches 7.38. Lactose solution was given not for any possible influence on the urinary reaction; it happened that we were giving it at this time for the effect in reducing the loss in the body weight during the inanition period.

Infants fed on lactic acid (sour) milk[3] alone will produce a strongly acid urine unless the diet is neutralized by sufficient base-producing fruit juice.

Table 3

INCREASE OF ORANGE JUICE ADDED TO REGULAR DIET

A. J. P., Age 7 Years

Date	Average pH	Ounces Orange Juice
October 15	6.09	4
October 16	6.09	4
October 17	6.087	8
October 18	7.34	8
October 19	7.1	12
October 20	6.51	12
October 21	6.11	12

Orange juice was begun with 4 ounces and increased to 12 ounces daily. The figures are average of all specimens secured in 24 hours. While the pH goes up in a general way while increasing the amount of orange juice, it soon returned in this instance to the original level. This phenomenon has been reported by others on a regular diet with a fruit juice, when no further additions or changes have been made in the diet.[4]

Table 4

pH BEFORE AND AFTER CHANGING TO KETOGENIC DIET

A. J. P.

Oct. 7	Regular diet with orange juice for 3 days			
Oct. 10	5:30 A.M.	pH	8.53	Ketogenic diet to begin
Oct. 11	2:00 P.M.		4.85	1,300 calories
	5:30 P.M.		5.7	
	8:30 P.M.		5.02	F 126 gms. C 16 P 26 42 gms.
Oct. 12	5:30 A.M.		4.92	Ratio 3 to 1
	6:00 P.M.		5.23	
Oct. 13	5:30 A.M.		4.99	Average for 3 daytime specimens
Oct. 14	5:30 A.M.		4.92	

This child had been on a regular diet for the first three days represented in *Table 4*. With that diet orange juice was given, 16 ounces daily. On the last day of that diet the pH was measured at 8.53, the urine was highly alkaline to litmus. This reading should probably not be higher than 8.0, as determinations are unreliable for an alkaline urine above pH 8 for the reasons that the quinhydrone powder is more soluble than at the lower pH. (Quinhydrone is only slightly soluble in acid.)

The ketogenic diet which followed, F 3: C P 1, brought the pH down to 4.85 within 24 hours. Low acid values were easily obtained from this ketogenic ratio, without the use of drugs.

Table 5

KETOGENIC DIET WITH ADDITION OF ACID SODIUM PHOSPHATE

A. J. P., Age 7 Years

		pH	
Oct. 22	5:30 A.M.	6.64	Regular diet
	Ketogenic diet begun, ratio 3:1, also acid sodium phosphate 5 x 5 grains.		
	1:00 P.M.	6.11	
	5:00 P.M.	5.57	Average 5.88
	7:40 P.M.	5.97	
Oct. 23	1:15 A.M.	5.47	
	2:00 P.M.	4.78	Average 5.01
	5:00 P.M.	4.8	

Table 5 furnishes an illustration of a prompt drop from pH 6.64 to 5.47 within 24 hours, and the further drop to pH 4.8, which are low values that are considered bactericidal.

Table 6

KETOGENIC DIET WITH ADDED AMMONIUM CHLORIDE

	G. B., Age 13 Years	pH
Oct. 21	Regular diet with 12 oz. orange juice, average	6.35
Oct. 22	5:30 A.M.	6.42
	Ketogenic diet begun with ammonium chloride 5 x 5 grains.	
	11:30 A.M.	6.92
	5:30 P.M.	5.54
	7:30 P.M.	5.14
Oct. 23	5:30 A.M.	5.02
	8:00 A.M.	4.95
	11:05 A.M.	5.58
	1:00 P.M.	4.96
	4:15 P.M.	5.10
	6:00 P.M.	5.03
	7:35 P.M.	4.93

Here the pH was 6.42 at 5:30 A. M., just before the first high-fat meal, about 12 hours after discontinuing the orange juice and regular diet. Within 12 hours after beginning the ketogenic diet, in addition to ammonium chloride, the pH had steadily dropped, down to 5.14. On the second day of the diet five specimens were examined, with a range of 5.58 to 4.93, averaging 5.08. This agrees with what other writers

KETOGENIC DIET RATIOS 1:1 AND 2:1

DETAILED DAILY RECORD OF E J AGE 6 YEARS JULY 8-26, 1934

APPETITE	N	N	N	N	N	N	N	N	N	N	VOM	*	N	N	•	N	N	N	N
TEMP MAX	99.2°	100	99.4	98.8	99.0	99.4	99.4	99.4	99.0	99.8	100	99.6	99.6	99.4	99.8	100.4	98.6	99.0	99.0
DIET	REG. ●	REG.	REG.	REG.	REG.	REG.	REG.	REG.	REG.	KETO GENIC ●	K	K *	K	K	K	REG.	REG.	REG.	REG.
ORANGE JUICE	480 c.c.	900	720	840	1320	1330	1100	630	-	-	-	-	-	-	-	-	100	150	150
URINE EXCRETED	950 C.C.	1150	1200	1300	900	1030	930	1100	620	640	405	445	555	530	685	470	880	1385	1100
pH OF 24 HR. URINE SPEC	6.98	7.18	6.90	7.03	7.56	7.74	7.74	7.87	7.70	5.28	5.12	5.38	5.80	5.80	5.90	5.82	5.95	6.20	6.45
DIACETIC ACID IN 24 HR. SPEC	-	-	-	-	-	-	-	-	-	+	+	+	+	-	-	-	-	-	-
DAYS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

● REGULAR BALANCED DIET - SAME FOODS AND SAME AMOUNT EACH DAY. N - NORMAL
● KETOGENIC DIET - FAT 115 GRAMS, C 55 GRAMS, P 60 GRAMS. DEC. C 5 GMS & INC. F 5 GMS DAILY.
* ATE ONLY PART OF EACH MEAL DECREASED F 10 GRAMS AND INCREASED C 10 GRAMS EACH DAY.
• NAUSEATED - ATE LITTLE

have shown as to the probable adjuvant effect of this acid-forming drug. Ketosis appears more rapidly than with the ketogenic diet alone.

On the ketogenic diet the child became nauseated and vomited, probably from ketosis. Daily reductions were then made in the fat of the diet and increases in the carbohydrates. It was two days, however, before the diacetic acid disappeared from the urine when the pH gradually increased. Then 100 to 150 c. c. of orange juice was added to a regular balanced diet, bringing the pH to an average of 6.1, and on the third day 6.45.

Table 8

URINARY pH IN RENAL CALCULUS (POSTOPERATIVE PERIOD)

B. F., Age 3 Years

	Urine from Infected Kidney		From Normal Kidney
Sept. 12	7.13	pH	5.55
13	7.4		5.6
15	8.7		----
17	Drainage tube removed		7.2
17	----		8.94
18	7.41		8.84
19	7.9	8.87 and	7.9
20	7.82 (24-hr.)		7.07 (24-hr.)
21	8.97		7.38

This child was offered a normal diet with orange juice during convalescence following removal of stone from the renal pelvis.

The figures in *Table 8* are shown not because of dietary influence, but because the urine from the two kidneys had a very different pH for the first few days following removal of stone and beginning of surgical drainage from the infected renal pelvis. After the removal of the drainage tube part of the infected urine flowed down normally through the ureter, entering the bladder. The pH of the bladder urine became elevated and remained so. Purulent urine has a high pH. The ketogenic diet with ammonium chloride was later given to this child and she made a normal recovery, with complete disappearance of pyuria.

Table 9

ACUTE FEBRILE PYELITIS

Boy, Age 18 Months

Treatment	Day	pH	Condition
Regular diet	1	6.85	White blood count 25,000
Urotropin	2	5.59	Polys. 75 per cent
Acid. Sod. Phos.	3	5.59	Pus cells in urine High fever
Regular diet	4	5.71	
No drugs	5	5.56	
	6	5.75	High fever
Add orange juice	7	5:30 A.M. 5.88	No fever after this date.
		4:15 P.M. 7.11	pH at higher level
Up to 4 oz. with	8	5:30 A.M. 6.0	Normal white count. A
each meal		4:45 P.M. 7.17	striking change for the better. No pus

Treatment continued until tenth day. Recovery.

This child was treated for pyelitis for three days on a regular diet and acid sodium phosphate. The urine did not at any time develop a pH as low or lower than 5.5, a degree of acidity which is considered optimal for bactericidal effect.[4] The range of the pH was upward after beginning the orange juice and discontinuing the drug. On the seventh day, with the first feedings of orange juice, the fever disappeared coincident with the rise in the pH to 7.1. The

orange juice was pleasing to the child and seemed to play a part in the rapid return of well-being.

SUMMARY

It is not my intention to draw conclusions, at this time, as to any therapeutic results from diets in relation to the hydrogen ion concentration of the urine.

Values for newly born infants are shown. Several older children were given normal or ketogenic diets, a moderate amount of orange juice, and two cases are cited in which acid-forming drugs were used. A child with unilateral renal infection due to calculus had a higher pH in the urine of the affected side. A case of acute pyelitis is cited.

There is much daily and hourly variation in the pH of the urine, even on an attempt at a uniform dietary intake. This fluctuation is present in all the zones of pH, whether low, average or high.

The 5:30 early morning urine before any food is begun for the day tends to be lower in pH on all diets than later in the day.

Probably a larger share of a normal diet should be base-forming juices, not only orange, but tomato[5] and grape, as well, for these have all been found by recent observers to be of equal value in rendering urine less acid. Children on unregulated diets complain not rarely of a sensation of burning on urination.

The child on a high ketogenic diet gets tired of the monotony, may become nauseated, and vomit easily, at times from ketosis. Fruit can be given during such a diet, as an aid to the appetite; if desired, the selection may be made from the fruits which are acid-forming, such as plums or cranberries. A ratio of 1 to 1 or 1½ to 1, combined with the administration of an acid-forming drug, would make for a more practical dietary regime, as well as giving maximum benefits from the urinary acidity.

REFERENCES

1. Blatherwick, N. R.: Arch. Int. Med., **14**:409, 1914.
2. Montagnini, L.: Ketogenic Diet in Bronchial Asthma. Abstract J.A.M.A., p. 720, Sept. 1, 1934; Minera Med. Turin, p. 877, 1934.
3. Blatherwick, N. R.; and Long, M. Louisa: Jour. Biol. Chem., **53**:103, 1922.
4. Mrak, E. N.; Smith, C.; and Henriques, V.: Proc. Amer. Soc. for Hort. Sci., **5**:30, 1933.
Helmholz, H. F.; and Osterberg, A. E.: Proc. Staff Meeting Mayo Clinic, **9**:46, Jan. 17, 1934.
Dunlop, D. Melville; and Dick, I. Lawson: Edinburgh Med. Jour., **40**:74, May, 1933.
5. Saywell, L. G.; and Lane, E. W.: Jour. Nutrition, **6**:263, 1933.

DISCUSSION (*Abstract*)

Dr. Nelse F. Ockerblad, Kansas City, Mo.—Since Helmholz, Anson Clark, and others have written extensively on the production of ketonuria by means of a high fat diet, a great wave of enthusiasm for this new therapy has swept over the country. In consequence there has been considerable disappointment in the results obtained. Hitherto incurable urinary infections were supposed to melt away under this new and magical form of treatment. May I point out to you a few of the difficulties in the way of this new therapy?

In the first place, it has never been adequately proven that ketonuria is necessarily fatal for bacteria. Mitchell and Scott, of the University of Toronto, proved that urines with a pH of 5.4 to 5.6 were not necessarily bactericidal. These workers based their observations on 75 non-surgical cases of pyelitis and pyelonephritis which did not respond to any of the ordinary treatment methods. They found that in addition to the dietary program, to produce an acid urine it was necessary to reinforce with such substances or acidifiers as sodium biphosphate, ammonium biphosphate, ammonium chloride, and other similar drugs; but that even with these the acid urine alone was not bactericidal. The addition of hexamethylenamine or similar formalin releasing compounds produced about 40 per cent of cures in these hitherto incurable conditions. We are all aware that in children the majority of the urinary infections clear up on almost any sort of suitable treatment; for instance, rest in bed and plenty of water will cure half of them. It is impossible to keep children on a high fat diet longer than two weeks at a stretch. The child will not eat any food at all rather than eat this high fat diet.

An example of what I mean, is a little girl four and a half years old who had a stone in the left kidney, which I removed. I placed the child on a ketogenic diet and kept her on it for three weeks. She was on the diet when her mother took her home. Her mother reported to me a few days ago that during the fourth week the child sat up in bed in the middle of the night and screamed out, "Mother, I just hate mayonnaise." Needless to say, the mother was a parent of considerable sense and immediately put the child on a regular diet.

Another difficulty in the way of this extremely simple procedure is the estimating of the hydrogen-ion concentration of the urine. If the urine is older than fifteen minutes, the results are apt to be very unreliable; a change takes place rapidly in urine which has stood awhile in the open air. In unilateral infections, it has been my experience that it is quite difficult sometimes to get the pH of the urine of the infected kidney down into the 5.4 group, while it is relatively easy to get the urine of the other side down into the 5.4 to 5.6 pH group. We had a very interesting experience along this line in a little child that had a pyelotomy for stone in the left kidney. When the stone was removed, a catheter was placed in the pelvis of this operated kidney and brought to the outside. Most of the urine that passed from the bladder came from the right or uninfected kidney and the urine from the left kidney passed out through the tube in the wound. Very shortly we had the urine from the uninfected kidney down to 5.4 to 5.6 constantly. On the opposite side it persisted in remaining at a level of 8.6 until one day the catheter dropped out and the urine started passing down into the bladder, mingling with the urine from the uninfected side. Immediately we had a urine of 7.6 and all the ketogenic diet in the world and all of the acidification would not bring it down until the pus began to clear up in the urine. I have had this experi-

ence repeatedly in adults. Dr. Carlson, my assistant, and I, a few days ago, tried an experiment upon ourselves and found that we could lower the pH of our own urines 0.6 within an hour by drinking 1,000 to 1,200 c. c. of water. It seems to me that the effect of dietary change upon urine reaction is a very important addition to our therapy in the handling of urinary infections. On the other hand, it is not the panacea that certain enthusiasts would have us believe.

BOUNDARIES OF DERMATOLOGY*

By THOMAS WHITEHEAD MURRELL, M.D.,
Richmond, Virginia

This is a discussion of the economics of dermatology. It is of little value to those of us who are established, through years of practice, but should be of value to the younger men. We are now in the midst of an economic revolution. Whatever its termination, we can know that it will not be the same world wherein the revolution started. Prosperity will undoubtedly return, but it will not be the prosperity we once knew. Our specialty evolved out of the excellencies of the old order, but the forces which produced it will be changed, and there are destructive forces against it. These last we must watch, to preserve a specialty worth while.

To develop my theme I will be somewhat autobiographical, and go back to the year 1904, when I spent an all too short time in the clinics of London, where I met some really great men: Radcliffe Crocker, Colcott Fox, and his assistant, Adamson; Sequiera, Pringle, Galloway, and McCleod. Meeting these men, and our own John Fordyce and Henry Fox, dermatology was elevated in my eyes to a great department of medicine. The field was wide, and necessitated a thorough acquaintance with syphilis, for in those days, before the dark field and the Wassermann, the eruptive condition of syphilis was quite common and was a part of practically all clinical differential diagnoses.

Syphilis, then, as now, was divided among many chairs. In America the two best text-books were those of Taylor, and White and Martin, but these were text-books on genito-urinary diseases, and in most colleges syphilis was attached to this chair. The dermatologist felt that syphilis was the most poorly taught of all the great subjects, because each chair was teaching a phase only, and there was a necessity for constructive teaching. Around 1912 a committee of the American Medical Association was active in having syphilis classified with dermatology as a teaching chair. This has always been combatted by the genito-urinary men, and it was not uncommon to see these far out-stripping the dermatologists in the amount of syphilis under their care.

The general practitioner also saw no reason to refer such cases for treatment, and it was difficult for the dermatologist to secure cases until the introduction of the arsphenamines in therapy. The use of this new, and fairly technical procedure, greatly increased the strength of the dermatological position, and from this time forward commence to grow in fame the names of dermatologists now known as great syphilographers. The other specialties of medicine stood to one side until the introduction of spinal therapy. This was immediately taken up by the neurologists and a very great part of neurosyphilis is now treated, and perhaps properly so, by this department of medicine.

Thirty years ago the x-ray was just developing as a therapeutic measure. There were much uncertainty and many tragedies. The occasional brilliant result did not seem to justify the hazards, and so the old machines were discredited, except with a few men, notably Dr. W. A. Pusey, and a new man, the roentgenologist, came into the dermatologic field. He had a superior equipment and a better technic, and started to build for himself. In doing so he established a code. This code was a dominance of his own kind, and to treat cases, not as a part of other practice, but as the work of his own specialty.

Since x-ray is the greatest single therapeutic agent, good results were obtained. They did not add to the fame of the dermatologist, but of the roentgenologist, and it was not long before the roentgenologist was practicing dermatology on a large scale, and, for that matter, he still is. Now comes on the field the figure of George McKee. No matter if others preceded him, and credit is to be given to Remer, Weatherby, still it is due to McKee, and none other, that the x-ray machine is now installed and safely used in the office of all dermatologists. He literally saved the situation economically, and if dermatology today is a specialty which justifies itself economically in years required to prepare it, the real credit goes to George McKee. It is his, for through him

*Chairman's Address, Section on Dermatology and Syphilology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

the attacks of the x-ray clan have been turned back, and this situation very nicely handled.

Next we have the specialist of internal medicine, the physician who styles himself an internist. The word "internist" is hard to define, but apparently means a man who rids himself of general practice, and would by this have more time to give to the study of diseases, particularly of diagnosis. Such men, handling hay fever and asthma, were naturally interested in allergy, and since a certain group of dermatological conditions is allergic, naturally began to treat such cases. Many of these men have developed this particular phase into a specialty of their own, and have actually at times cured conditions in which the dermatologist not investigating along this line, has failed. Such success has led to a broadcasting of the idea of allergy to many conditions, and we now see the multiple scratch test for every known condition. I have myself seen cases of lupus erythematosis, lichen planus, and the tricophytids, with the tell-tale scratch marks down the back showing where the allergist had passed by. So it happens that in most allergists' offices there are many cases, primarily dermatological, which have been side-tracked from the older specialty.

In later years I have several times come upon a state of mind in the pediatrician, which has been called "the pediatric viewpoint." This is a defense attitude in building up his own work. Stated simply, as the pediatrician has frankly said to me, they acknowledge no superior in conditions affecting the age limit which determines their field. Because of this they feel themselves competent to handle any average condition occurring in their work. They therefore regard impetigo, scabies, eczema, tineas, and other forms of contact dermatitis as pediatric and not dermatological conditions. Cases which come to me from a pediatric source are always treated, and frequently well treated.

Since the pediatrician does not use x-ray his hook-up is more with the roentgenologist than with the dermatologist. Now, certain things are common, and certain things are rare, and this is a search into economic sources, and the economical importance of these things can be judged from the ledgers of any dermatologist's office. It is foolish to dilate on the income, say, from impetigo, compared to the income from xeroderma pigmentosum.

Last, but not least, comes the beauty parlor. The cosmetic urge on the part of women has brought into existence in the last twenty years a great industry, and the establishment of that unit called the beauty parlor, and the person who styles himself a "beautician." They have a real place in society, certainly in the care of the hair, as the modern woman demands individual service. However, they have gone far afield in their work, such as in the removal of blemishes and superfluous hair, by electrolysis; and the treatment of the scalp infections is being taken up by them in a large way. They are prescribing for, and treating acne, as well as other dermatological conditions. This would not be tolerated by health departments if these conditions were contagious, or dangerous, and will continue to be ignored by the health authorities unless pressure is brought from some organized source. The terrible tragedies of the use of x-ray for epilation in beauty parlors would not have occurred had they been investigated by the only people with power to stop them.

Now, to narrow down the idea. There is nothing unethical, nor unreasonable, in the attitude of the roentgenologist, the allergist, or the pediatrician. They are only doing what they should do, that is, looking out for themselves. No physician has any right or privilege as to whom he shall treat. The patient has the right to consult whom he pleases, and if we sit still and allow our specialty to be dismantled, even though by our intimate friends, we are only getting what we deserve. We are, of course, more interested in technical problems which arise in rare conditions, but as workers we have an income to produce, and all our enthusiasm for the obscure does not equal the income from the commonest dermatological condition.

Now, the way to me is plain, and has been shown by George McKee. He it was who saved us from the greatest of our opponents, namely, the roentgenologist. To "carry the war into Africa" we must start an offensive into the medical backgrounds of dermatology. This will mean that we shall study medicine again, and keep up our interest in its problems. To our equipment will be added the basal metabolism machines, and we shall bring back the stethoscope, blood pressure apparatus, and the clinical thermometer as dermatological instruments. It further means an added study of dietary problems, particularly in infants, and the use

of the laboratory to a far greater extent than through the Wassermann, scales and biopsy.

It also means that through local societies we should demand an investigation and regulation of beauty parlors, and their procedures. I am entirely aware that the things said here are not those usually heard in scientific session. I hope I make myself plain in describing what others have done in building up their spheres, I am speaking in approval and commendation for their good judgment, and mention them only to stimulate us to an equal measure of common sense. The ideas expressed are not original, and in the main have been wafted over to me across collections of broken ice floating in amber fluid, and if the season be proper, adorned with sprigs of mint. Since the Chair's address is not discussed, refutation of these ideas is in order, but only in the same environment.

DIAGNOSTIC POINTS IN PULMONARY TUBERCULOSIS*

By PAUL H. RINGER, M.D.,
Asheville, North Carolina

The writer almost hesitates to present before this gathering such an elementary contribution. We can, however, secure an analogy from the field of sports. Those of us who follow in the papers the doings of the various football teams during the fall of the year (and who does not to a greater or less extent) often see the following statement with regard to the practice of the team on a given day: "The afternoon was devoted to fundamentals." It is with this idea of getting back to fundamentals that the following has been written. It is simple and elementary and important; so are fundamentals.

Despite the crusade against tuberculosis that has gone on for well over a quarter of a century, the diagnosis of the disease in a great many instances is not being made as early as it should be. In my office I see patients, at one time or another, from practically every state east of the Mississippi; and the diagnoses made would seem to represent a cross section of the diagnostic acumen of the profession in the eastern states. In a recent investigation of a series of 300 of my tuberculous patients 56 per cent were "third stage," according to the classification adopted by the National Tuberculosis Association. This is not a healthy state of affairs, and if tuberculosis is to be stamped out something must be done to bring earlier cases to active treatment.

Why is it that many patients go undiagnosed until they present destructive lesions; that is, cavity formation?

The fault lies partly with the patient and partly with the medical profession. Let us first consider the culpability of the patient. It is extraordinary how long many people will endure failing health, often with definite symptoms, and yet fail to seek medical aid. A search among my histories shows that the majority of patients waited from two to six months after the onset of symptoms before going to see a physician. Some (a very few) have waited as long as two years. During the months of procrastination a normal life had been lived and no particular care taken. Fear, laziness, a conviction that they would soon be all right, kept these people from the consultation room.

We medical men can do little if people will not come to us. We cannot stand on the street corners and solicit patronage. We can only reiterate our warnings, which, alas, too often fall upon deaf ears.

Now let us turn to the other side of the picture, the culpability of the medical profession. It is a fact that entirely too many people having tuberculosis consult a physician promptly and are improperly diagnosed or else no diagnosis is made. They are told all sorts of things: That they have bronchitis, a cigarette cough, "just a cold," weak lungs, or what-not, and are treated with cough mixtures or tonics. Finally there is still in existence that terrible blot on our profession which consists in telling the patient who has expectorated 15 c. c. of blood that it came from the throat and that no attention need be paid to it. It seems extraordinary that such statements should be made in 1934, but this pitiful fallacy is not stamped out as yet.

Why is it that many men throughout the country are still failing to recognize easily diagnosticable tuberculosis? There are several reasons:

(1) *Failure to have tuberculosis constantly in mind.* The general practitioner who sees but an

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occasional case of tuberculosis, say three or four a year, is apt not to be on the watch for it. It is not a difficult disease to diagnose save in its minimal form, when it frequently puzzles the most expert. Many a physician feels that because he cannot hear anything grossly abnormal with the stethoscope all must be well. The majority of cases of tuberculosis do not need physical examination for diagnosis, though it is all-important in determining the extent and nature of involvement. Having the possibility of the disease in mind, a carefully taken history, followed by a painstaking inquiry into the symptoms will, in the great majority of instances, point to the correct solution of the problem. "Symptoms tell what is happening," as Lawrason Brown says in his "Tuberculosis Theses." Furthermore, in the eliciting of symptoms little, if anything, depends on the personal equation; the symptoms are there or they are not, and that is that! (Naturally, in this discussion we are postulating cooperation between patient and physician.) The scales show loss of weight, the thermometer indicates fever, the blood examination shows anemia, cough and sputum are present or absent, and so on.

(2) *Failure to examine sputum, or else satisfaction with one negative examination.* Sputum examinations should be made routinely and frequently. Every physician should know how to do this simple bit of laboratory work himself. The sputum of any person who has been coughing two weeks and who is producing sputum should be examined for tubercle bacilli. If the sputum is negative it should be re-examined several times. One negative examination has but one significance: look again! Indeed, with the passage of years and the development of better technic in sputum concentration, many of us feel that continuous failure to find tubercle bacilli in any given sputum constitutes a very strong argument against the existence of tuberculosis.

(3) *Failure to take a good x-ray picture of the chest.* I say "good" advisedly, for some of the chest films I have seen have been either so overexposed as to blot out everything but ribs, spine and heart, or else so "soft" as to permit of no adequate interpretation. X-rays are being taken more and more nowadays, but they are often delayed for an unjustifiably long period, and not infrequently a patient relates that the physician had to be asked to have the ray made, as he did not seem to think it necessary. The x-ray is of extreme value in diagnosing tuberculosis, especially tuberculosis in its minimal stage; but let us not forget that all the x-ray ever has revealed or ever will reveal is differences in density, and that it is the proper interpretation of these differences in density that results in diagnosis. The correct interpretation of an x-ray film is a far more intricate matter than the demonstration of tubercle bacilli in the sputum and the chances for error in this field are infinitely greater than in the latter. Interpretation should therefore be done by one fortified by experience and at all times the physician rendering an opinion on the x-ray should be fully informed of the clinical condition of the individual whose film he is studying.

(4) *Failure to treat idiopathic pleurisy with effusion as a manifestation of tuberculosis.* Many times in taking the history of a patient one learns that four, eight or twelve years previously he had a pleurisy with effusion; that he was aspirated once or twice; that he was in bed a month or two, recovered and returned to work without even being warned by his physician to take particularly good care of himself and to report three or four times a year for a check-up. If more stress were laid upon the importance of actually treating idiopathic serofibrinous pleurisy as a tuberculous disease (which it is), far fewer individuals would return in later years with a well developed pulmonary process.

The diagnosis of relatively early (but not truly minimal) cases of tuberculosis is usually easy and at times absurdly simple. The truly minimal case presents a far more difficult problem and, though possibly suspected, should be left to the expert for confirmation. For the diagnosing of ordinary tuberculosis no expertness in the eliciting or interpretation of physical signs is necessary. Bear in mind four things and you will miss but few cases:

(1) Think of tuberculosis as an ever present possibility.

(2) Secure a careful history and an equally careful list of symptoms.

(3) Examine sputum.

(4) Take x-ray.

HOW TO INCREASE THE PHYSICIAN'S INCOME AND AT THE SAME TIME REDUCE THE COST OF MEDICAL CARE*

By MONTAGUE L. BOYD, M.D.,
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Urologists should be as much interested as other members of the medical profession in discussing the medical problems which confront physicians today. Urology is one of the most important branches of medicine and urologists, as a rule, have a praiseworthy conception of the connection between genito-urinary diseases and disease elsewhere in the body. On that account they demand more consultations with other specialists than the men of any other special branch. Then, the successful practice of urology is accomplished only by the exercise of unusual professional ability and at a greater expense to the patient than most other special examinations. What other branch of the medical profession is there which employs examinations on the whole so uncomfortable to endure as cystoscopy and ureteral catheterization, massage of the prostate to express secretion for study, and calibration and dilatation of the urethra, examinations which patients have learned to dread so that they must often be persuaded to undergo them. Nor is that all. Urological examinations are often expensive, because many patients have to be hospitalized for their accomplishment, and also because they include roentgenographic studies of the genito-urinary organs and roentgenograms made accompanying intravenous and retrograde injections for the purpose of outlining the urinary tract. Then, too, the armamentarium of the present day urologist is costly to procure and to maintain. And, finally, the ordinarily performed, complete, careful, urological examination which must include a retrograde urogram, consumes much more of the physician's time than almost any other medical examination. It usually requires from an hour to one and a half hours. Such things, along with patients who have urinary retention which must be relieved by catheterization, the capriciousness of retention catheters, and the elaborate detail which is now recognized as necessary for success in the pre- and post-operative care of prostatectomy and partial prostatectomy cases, are all sufficient to keep the ordinary urologist, such as I claim to be, not only physically occupied, but more or less constantly in a state of anxious expectancy. Therefore, since urological examinations and treatments are painful for the patient and trying for the physician, and more time consuming and expensive than most of the medical examinations and treatments ordinarily employed by the profession, urologists should be particularly interested in what I have to say.

In the discussion of the cost of medical care and medical economics, there is almost nothing which has not been proposed. An enormous amount of time has been wasted in the study and discussion of things which have little bearing upon the solution of the problems confronting the medical profession today. As I see it, there are among all the points which have been discussed only a few fundamental facts which are worth consideration and which must, to gain the attention of the profession, be frequently stressed by those of us who are indiscreet enough to say what we think. And it is the purpose of my talk to present these facts for your consideration. You have already heard some of the things which I have to say, repeated many times, but for the sake of completeness I find it necessary to include them in this discussion. I offer no apology for what I have to say, for I think that it is high time for physicians to show a little more common sense about the things which are vitally important to their welfare.

MEDICAL ECONOMICS AND THE COST OF MEDICAL CARE

In discussing the subject of medical economics the thing which should always be mentioned first, and which is of first importance, is the welfare of the patient. All physicians worthy of the title of doctor of medicine will without reservation agree with that sentiment. But, of almost equal importance is the welfare of the physician upon whose activities the continuation of all medical service is dependent. Much sentimental, but little practical consideration has been accorded this point in the public discussion of medical economics, but I should think that anyone could see that, unless provision is made for the physician's physical, mental, and economic welfare the service which he will render will be inferior to the best of which he is capable. And how many patients are there (or patient's families) who do not urgently desire and insist upon the very best service which they can afford when serious illness is encountered? And if the question is

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asked why physicians should discuss such matters I should like to reply by asking whose business it is except that of the medical profession to see that physicians are physically and mentally fit to render the best type of service. The time has long since arrived when it became necessary to recognize the fact that in recent years economic change throughout the world demanded a change in the existing methods of practicing medicine.

THE PHYSICAL WELFARE OF THE PHYSICIAN

Beginning with the time at which a man enters medical school and continuing throughout the time he occupies himself with the practice of medicine, so little attention to, or respect for, his physical well-being is shown by those with whom he comes in contact that he gradually comes to believe that any thought concerning his own health must be an exhibition of selfishness, and any care for his own well-being must come after every consideration has been given the welfare and even the convenience of his patients, no matter how unreasonable or inconsiderate the demands made upon him happen to be. (If patients only knew how much more willingly and really how much better they are served with medical attention when they are considerate of and courteous to their attendants, I believe that the conduct of more of them would be better. May the Lord bless those courteous souls who do show consideration for us!)

Once a student passes from the undergraduate department of colleges and universities into the medical schools he is supposed to look out for himself; no longer are opportunities and facilities for physical exercise and recreation supplied by the school authorities for his use as in the undergraduate departments. As his medical education advances his opportunities for rest and recreation decrease as his daily hours of work are gradually increased, so that in time he usually comes to a point where he works far into the night, where Saturday afternoon is no longer a holiday, nor Sunday a day of rest. When as a practicing physician his practice grows to a point where he is constantly busy, many patients disregard the fact that, like other busy people, he has need for rest and recreation during the hours which he has selected for these—when he can best obtain them without sacrificing his patients' interests. Even at night, when he should be at home resting or asleep, many are inconsiderate enough to call him to the telephone to question him about unimportant things or about professional matters which could easily have been attended to during his office hours. Frequently patients, the urgency of whose complaints cannot be determined by telephone, insist upon seeing him before or after his usual office or working hours, when it would be just as convenient for them to see him during the hours which they must know are universally set aside for obtaining business engagements and seeking professional services. And nearly always the ones who are the most thoughtless of his welfare, of his need of rest, recreation, and comfort, and who demand the most, are those who pay him the least, or nothing at all. We have no time to go into this subject further, but whether you are willing to admit all that I say or not, you do know that this is a subject of great importance. And if nothing else is done concerning these things, the medical profession should at least see that opportunities for physical exercise and recreation be supplied medical students and hospital interns and officers. The medical school and hospital authorities will do nothing unless the matter is brought to their attention.

THE FINANCIAL WELFARE OF THE PHYSICIAN

Freedom from financial worries is almost essential for the maintenance of good health and clear thinking. Therefore an adequate income for the physician is necessary to enable him to be in the best condition to render the best medical service.

A physician's social position in his community is more or less fixed and at much the same level all over the world. He and his family are expected to associate with and live among the people who are able to afford a rather expensive living standard; therefore he must maintain the appearance of being financially able to belong to that class. He must have a nice looking home, and he and his wife must dress well, he must have a good automobile, and give his children educational opportunities which that class of people usually give their children. He is inevitably placed in this class in society by possessing an education much above the average and by the respect which is afforded him because he is a physician.

Furthermore, he must have an income which will permit him to possess all those facilities which are necessary for rendering the best medical service to the sick: up-to-date apparatus and instruments, a convenient office, and a secretary or nurse, and perhaps a younger physician for an assistant. He must be able to buy such medical magazines and books as he needs, and he

must attend at least the more important medical meetings, clinics, and hospitals, whether they be near at hand or in distant cities. And to offset as far as possible the injurious effects of a life of constant stress and strain, such as any busy physician leads, he must have a sufficient number of vacations of adequate length and his income must be sufficient to keep him from worrying about financing such rest periods. Usually his loss from being away from his work is greater than the travel expenses of his vacation.

It should be remembered that the physician deals most intimately, of all people, in matters of life and death, so that even under the most favorable circumstances the practice of medicine is sufficiently trying to the health and courage of the strongest. The burdens borne by physicians are more or less unique, for besides having difficulty in finding time for rest and recreation, with long and irregular hours for work, the greater part of his life is spent in contact with those who, as sick and anxious people, possess a psychology which is, to say the least, not normal. Moreover, in assuming responsibility for the health or life of his patients, he is destined to live under a constant strain of attempting to assure his patients and their families, for their own happiness, if for no other reason, that the confidence which they have in him is justified, or, on the other hand, where confidence in him seems to be lacking, he must create it or sooner or later discharge himself or be discharged from the case because patients do not get well readily when they do not have confidence in their physician. And, although no earthly intelligence can consistently accomplish it, he must make unceasing effort to have his diagnoses and prognoses correct, and his treatments successful, so that even when he awakes in the night the more difficult problems concerning the welfare of his patients spring into his conscious mind. With all, he must listen patiently to a thousand irrelevant facts not only about the health of the patient, but often about that of the whole family, and very commonly concerning their bad financial condition, and from these he must glean the information which he desires concerning the patient's complaints. If worn out with conversation he tries to cut corners by asking a new patient what is the matter with him, he will invariably be told, "That is what I came to you to find out," which to my mind is one of the best illustrations which intelligent people give of the psychology of the sick. He must spend hours in needless explanations and be patient and agreeable under even the most trying circumstances, at the same time displaying an air of confidence in himself which will reassure the anxiety of the patient and his family. That he feels unwell is no excuse for a physician: it is only too evident an admission that he may not be as efficient as usual.

Many of you may still wonder why I have gone into detail concerning this unpleasant side of a physician's life when there is so much that could be said which is pleasant. Besides the reasons already given, I may add that it is because I have had a great many physicians as patients and have observed what an injurious effect has been produced in many of them by the constant stress and strain of practicing medicine. Their nervous systems have been so abused by the strain under which they live that they are usually very difficult patients to handle and it is hard to keep them in bed unless they are so sick that they haven't the strength to get up. I know that physicians would be more efficient and far happier if their work were made less trying and their financial worries could be lightened.

THE WELFARE OF THE PATIENT

Now, from the patient's viewpoint, what are the things which are best for the patient? Almost everyone recognizes the fact that the laity think something is wrong with the medical service which they are receiving today. That an unwillingness to go to physicians for medical service exists, and also a dissatisfaction with that service as it is rendered is evidenced by the great volume of unpaid physicians' bills, which are thrown in the waste baskets every year, by the frequency with which people appeal to drug store clerks for advice, and by the enormous amount of drugs purchased which are not prescribed by the medical profession. Of course, a great many unpaid bills are the result of an inability of the patient to pay combined with the poor business methods used by physicians. But many others are the result of dissatisfaction with the services which have been received (in that they are not what patients thought they should receive or because too much effort on the part of the patient was necessary to obtain it) or dissatisfaction with the amount which has been charged them for services.

The medical profession, upon which rests the responsibility for the cost of medical care, must sooner or later accept the fact that the public feels sure that the cost of medical service is too high. Anyone who has followed what is being

published in the lay press of the United States will realize this fact. Of course, the fairly well-to-do patients can afford the present cost, but there are not many of these, and I believe that the great majority of patients, who ordinarily do honestly try to pay for medical service, cannot afford the present costs.

Next to the high cost of medical service, the most outstanding objection to medical service, as it is today, is the difficulty which patients experience in being sent from one physician to another, from one specialist to another. Of course, specialization is necessary. Where is the physician who can keep up-to-date in a knowledge of medical advances? No one with any understanding of the subject will disagree with the fact that specialization is essential. But is it necessary for a patient to travel from one physician to another, from one office to another, to make contact with office assistants, as well as the physicians, to have to explain to many people over and over again why he is a patient, how old he is, and where he comes from? Even a healthy man would be fatigued in carrying out such a plan, particularly if he visited all the specialists necessary for obtaining all the knowledge needed for a complete medical study.

THE SOLUTION OF THE PROBLEM

If, then, it is true that the physician does not have an adequate net income and that medical service is, to the majority of patients, too high and not sufficiently easy to obtain, what are we going to do about it? The answer is that both the expense of practicing medicine and the cost of medical care must be reduced, and in addition, physicians must be paid for much of the work which they now do for nothing in private practice, medical schools, and in part pay and free clinics. Let me try to tell you how this can be done.

The most direct method of increasing the income of the medical profession and one which has been very much neglected, is for physicians to be paid for the work which they perform in charity or part-pay hospitals and out-patient clinics; and I would like to urge that the medical profession begin now quietly to insist that physicians be paid for all of the charity and part-pay work which they are doing without financial recompense, for the cities, counties, states, and medical schools. There is not the least reason that I can think of that physicians should not be paid for charity work of this character. In answer to any reason which might be advanced, I could very easily present a list of young physicians who are doing this work, many of whom are in debt, often financially unable to go to important medical meetings which they should attend, and often unable to marry and have children on account of an inability to support them. I cannot understand why the medical profession, with all of its organizations, cannot agree to cooperate in demanding that at least the younger men, who do the more laborious tasks in this work, be adequately compensated. No publicity should be resorted to in such a movement, but an organized profession should move steadily toward seeing that this is done.

If the expense of medical care for the more seriously sick could be reduced physicians would at once begin to receive an enormous increase in their income, for such a large part of the money now spent for medical care by those who are really ill goes to hospitals, for drugs, medical supplies, laboratory work, x-ray examinations, consultations with other physicians (surgeons, internists, and specialists), and for private or special nurses, so that the physician, upon whom all these activities depend for their continuation, often goes almost without compensation, there being nothing left with which to pay him. Not infrequently a very sick patient will pay out several hundred dollars to a hospital and a similar amount for special nurses, and in the end pay the attending physicians nothing at all. In rare instances this is more than justified; in a limited number of cases it is and should be a great pleasure for physicians to render this service, but there is no excuse for the extent to which this practice is being carried.

Hospital expenses can be materially reduced by a simplification of the services which they render, also by patients who belong in so-called charity hospitals going to those hospitals, and by those who belong in wards going to ward beds for service instead of taking private rooms, and when ward patients need isolation the hospital should furnish such isolation without extra costs. Nursing service for even the very sick should, in the majority of instances, be furnished by the hospital; even when a special nurse is required the hospital in most instances should arrange to furnish that service at the rate at which they accepted the patient. In order to effect that plan, hospitals (and also patients in private homes) should employ practical nurses to do a large part of the work which is now done by graduate nurses. Naturally, most of this work in hospitals should be done under the super-

vision of graduate nurses, but I am satisfied that a practical nurse can do at least three-fourths of the nursing work which is now being done in hospitals by graduate and pupil nurses. There is no doubt about the necessity for maintaining the existing standard of education for nurses at its present level, but the number of highly educated nurses needed will be smaller if practical nurses are employed. And for the practical nurse, instead of spending much time in teaching her physiology, anatomy, and pharmacology, let instructions be given in how to render the thousand little services which make patients more comfortable and happy but which are, for a lack of time, left out of the curriculum of training schools and are known or practiced by only a few nursing school pupils or graduates. I have an outstanding memory of an undergraduate nurse who was at Johns Hopkins when I was the resident in urology. She was a little woman, whose face was badly scarred by smallpox, but every patient on the ward looked forward to her coming on duty at 7:00 to 9:00 in the evening, for in twenty minutes after she came she had everybody happy. She actually radiated confidence and happiness; bedside lights were fixed just right, cold feet were discovered, and hot water bottles supplied, the thirsty had fresh water, the smoker had an ash tray, the tobacco chewer, without being embarrassed, was given a place to spit; pillows were shaken up, windows were properly adjusted, and a hundred other things were done which the other nurses had not thought about. It always warms my heart and gives me a sense of pleasure to think of that little woman whose greatest service came from no, so-called, higher education.

Hospital expenses for patients can be further reduced by the plan already adopted in some places of shortening the length of time that patients are kept in the hospitals: either send them home or to a part of the hospital (or to another building) equipped for handling only chronic or ambulatory cases where they can receive a limited and less expensive medical care.

The principle reason why hospital and private clinical and x-ray laboratory charges are so high is that few laboratories have a sufficient volume of work. At the State Board of Health Laboratory in Georgia, where they do 50,000 or more blood Wassermann tests each year, the total cost to the laboratory has been less than 25 cents for each test. I am satisfied that an enormous reduction could be made in the present charges for clinical laboratory and x-ray work without reducing the net income if each laboratory had a sufficient volume of work; many of the present five and ten dollar charges could be reduced to two and four dollars. Already the largest part of laboratory and x-ray work is done by "technicians," and only a small part requires the attention of a graduate physician.

I feel that clinical laboratory and x-ray examinations should be made at a minimum cost to the patient instead of at a cost which often makes it difficult for the patient to afford all of the examinations which are necessary or desirable. In the past there was some excuse for subsidizing these accessories to medical examinations. But now the technic of making roentgenograms is so well established and the machines so perfected that there is no longer an excuse for the prices which are charged. Is a roentgenogram, for example of a leg or arm or shoulder, as valuable from the standpoint of time, thought, and physical energy expended as a five mile ride to a patient's house by a physician and a half-hour examination of the patient? And yet in most instances the roentgenologist charges more than the doctor, although the cost to him in time, energy, and supplies is by no means as great. It is time for physicians to give patients a square deal in these charges. We need to discard thousands of x-ray machines and laboratories which are being operated at only a small part of their capacity, and by concentrating our work in a few laboratories have the work done at a minimum cost.

A consummation of the changes which I have suggested here would be enormously simplified if a plan* which I proposed a few years ago were adopted. It included the following:

(1) Establishment of physicians' offices in hospitals or in buildings adjoining hospitals where a reasonable rental could be obtained, and time now lost in going to and from hospitals eliminated. Hospital patients would receive more and, therefore, better medical service from their physicians.

(2) Each of these groups of doctors to be composed of those who ordinarily work together and send patients to each other.

(3) Offices to be arranged to reduce overhead expense to a minimum: a large general waiting room with only small private waiting rooms, telephone service in connection with the

*1. New England Med. Jour., **205**: No. 1, July 2, 1931.

hospital switch board, and day and night call service for physicians through the hospital operators; examining and treatment rooms arranged so they could be used by one group of physicians in the morning and another group in the afternoon.

(4) A medical library containing current medical literature: books, magazines, and classified reprints.

(5) Use of the hospital pupil nurses and perhaps hospital house officers in the work in the physicians' offices and laboratories. Such a training in private practice would be especially valuable to the house officers.

(6) Use of the hospital x-ray and clinical laboratory by all of the physicians.

(7) Use of the hospital drug store for filling all prescriptions and obtaining medical supplies.

(8) Use of one record and history for the patient, and it to be sent with the patient whenever he is referred to any of the other physicians for consultation.

(9) The patient to be sent from one office or one laboratory to another in a dressing gown, and also in a wheel chair, if found desirable.

(10) Each physician to take the history of his own patients and to have full control of his own patients, just as he does now, requesting consultations as he does now. Each one to collect his own fees directly or through a central business office if he prefers.

(11) Reduction in laboratory, x-ray, drug, and consultation fees. The consultation fees could be much smaller than they are now without loss to the physician, since a consultant would have to give no time to making contact with the patient, nor to taking anything except the brief part of the history relating to his specialty, nor to preparing the patient for examination, nor explaining his findings as he has to do now so frequently. In addition to these things, his overhead costs would be less.

(12) In the end the physician's net income would be greater because the patient would have more money left to pay him after paying for his various other medical services. Then, in addition, his operating expenses would be less, and he would have the added facilities, through his connection with other physicians about him and the hospital house staff, for emergency service for his patients when he is not in his office, and attention for them when he is out of town.

DIPHTHERIA IMMUNIZATION*

By A. H. Flickwir, M.D.,†
Fort Worth, Texas

When I began the practice of medicine in southern Texas many years ago there was very little diphtheria in that section of the state, but upon arrival of great trainloads of people from the north, seeking new homes in the coast country, Rio Grande Valley, and the beautiful winter garden section, diphtheria made its appearance. I remember distinctly a family from Kansas in which four children all developed the disease a very few days after arrival, and it became necessary to send a long distance, to Houston, for antitoxin, as the drug store in the local county seat had only two or three 5,000-unit packages on hand. Each fall and winter saw more immigrants from the north and each year the ever-prevalent diphtheria. In fact, in those days over a quarter of a century ago, a physician quite frequently had to put up a strong argument in many instances before he was allowed to administer antitoxin.

Public health in Texas has advanced a great deal since those days and in checking up with the health officers of all of the large cities in Texas and with the large county organizations, I have found that Texas has made very good progress in the diphtheria immunization campaign. I was very much surprised myself to learn just what had been done. I am sure that all of you are tired of listening to lengthy recitals of figures. However, I wish to state that the number of persons immunized against diphtheria is very gratifying, indeed, and I am sure will compare favorably with any other state where distances are great and the population scattered. All of the large cities and county health organizations are carrying on diphtheria immunization campaigns continuously. The subject has received a great deal of attention in all of the health education programs, particularly the radio addresses and through the parent-teacher associations, medical auxiliaries, tuberculosis associations, and like organizations interested in public health.

The health departments are receiving won-

*Read in Joint Session, Section on Public Health, Southern Medical Association, Twenty-Eighth Annual Meeting, and American Public Health Association, Southern Branch, San Antonio, Texas, November 13-16, 1934.

†City Health Officer.

derful cooperation from the medical profession and I am sure that it is almost a routine in family practice now for the physician to immunize the young babies before they are a year old. Of course, that is as it should be, and preventive medicine, as I have stated many times before, should go hand in hand with curative medicine, and I think you gentlemen of the Southern Medical Association will find that it does so very well in Texas. Perhaps we have learned from the veterinarian that it pays, for we are a stock-raising state, you know, and no good farmer would think of not having his hogs immunized against hog cholera.

The methods of immunization vary. Some of the health officers use the Shick test first and again in six months; some only after the immunization, and some not at all in the younger groups. I also find that the tendency is all toward toxoid at this time. Many of the health officers use three doses, and some use the one dose alum precipitated. Of course, if the one dose method is as effective, it is much better from the health officer's standpoint, as it is sometimes hard to catch some of the little fellows for a second or third dose, especially since many of our rural folk are on the move. But this paper is not one of methods. That will be for the various practitioners to decide for themselves. I believe it is not necessary to give the Shick test to children who have never been immunized before administering toxoid. It is rather a waste of time and expense. But I do believe, of course, that after the immunization is completed that it is well in, perhaps, six months, to have the Shick test made. I am sure most pediatricians follow this method in their practice.

During the past winter many nursing projects were carried on over the state from C. W. A. and F. E. R. A. funds, and all of them stressed the importance of diphtheria immunization. The agreement between the Texas State Medical Association and the Texas Relief Administration, at present in force, offers an opportunity for the immunization of nearly all the children on the relief rolls, and the same should pertain in the various shelters for state and interstate transients maintained by the Transient Bureau. If the children of transients have not already been immunized against diphtheria or vaccinated against smallpox, they should be held long enough to accomplish this.

I have not said much about our own department in Fort Worth, but I do wish to say this: The Medical Society in Tarrant County has been very cooperative in our program of immunization which was started some five years ago. I adopted the plan of Dr. Shirley Wynne, of New York, furnishing signs for the physicians' offices, which said that the City Health Officer advises that children be immunized against diphtheria. The large number of children immunized subsequently by private physicians indicates that the signs were effective. I assure you, gentlemen, that the state of Texas has not been behind in the diphtheria immunization program. Our State Board of Health is furnishing the materials to county health organizations for those who are not able to pay and, of course, the large cities, through their health departments, are all taking care of their indigents through the health centers, clinics and schools.

One of the most effective methods of health education adopted in this state is the weekly article by our state health officer, Dr. John Brown, which is published in the small county weekly newspapers. Many people have been reached in that way, in addition to those who read our large metropolitan dailies.

SOME DEVELOPMENTS IN PSYCHIATRIC TEACHING*

By Spafford Ackerly, M.D.,†
Louisville, Kentucky

The rapid development of scientific medicine, especially in the last quarter century, made the test tube the chief actor on the medical stage and relegated the patient to an inferior role. It was not the medical profession, but rather the lay audience, that first noticed the seriousness of this turn about of the principal characters, and declared the cast unbalanced. While the audience realized it had no power to change matters, it did a lot of thinking in terms of balancing up the cast. This thinking resulted in adding another actor, or, rather, actress, whose part was ostensibly to assist and play up to the test tube, but more substantially to bring more attention to the patient.

This new member of the medical cast was the medical social worker who visited the pa-

*Read in Section on Medical Education, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

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tient's home and brought back to the physician an account of the social conditions under which the patient lived, conditions that might interfere with the physician's treatment of the case. Whatever is said for or against the medical social workers, they did jump into the breach which for a time was becoming wider as a result of the increasing emphasis, placed on the purely scientific side of medicine. The physician was often irritated by the social worker, partly because she was a lay person and partly because he realized his ignorance concerning the social factors in medicine. Medical social workers, on the other hand, knew very little about handling physicians and were often tactless in offering helpful information. There is no doubt they had a hard time of it. However, one feels they would have helped the cause more had they not gone ahead too independently in their social case work, but had more gracefully accepted themselves as the physician's social technicians.

Since the economic depression, the attitude of the medical profession toward these matters has changed considerably. The patient indeed is coming into his own. Physicians are becoming vitally interested in him and his social setting. When the patient's appetite is upset and he cannot sleep, the average physician now takes time to inquire into the patient's social difficulties. Medical education of late has been stressing the significance of this side of medicine, but many of us are at sea in knowing how to put this across effectively to the students.

In the teaching of medical students at the University of Louisville during the past two and a half years, we have made it a matter of routine for every student assigned to the psychiatric department in his junior and senior years to make home visits on every case assigned to him. Unfortunately for the department, but fortunately for the students, we have as yet no special social workers attached to our department. Each student must be his own social worker. We try not to shackle his mental faculties by a too rigid adherence to regimented social history forms when interviewing relatives. He has a guide to follow, but it is largely to help him organize material and write it up. It is often amazing what information pertinent to the patient's problems is dug up by these students. From the cultural point of view, they learn much that is of importance concerning the nature of man.

One senior student amused the group last week by recounting his experiences connected with a home visit on an out-patient medical case which was referred to the psychiatric department because of nervousness.

The student knocked on the door and the patient herself answered by calling down from the second-story window. Their conversation follows:

"What do you want?"

"I am Dr. So-and-So from the City Hospital. Don't you remember I talked to you at the Hospital about your nerves?"

"Oh, you are the nerve doctor! Well, I know all about that study of 'psychosopy!' and you didn't have to ask me all those personal questions. My husband is furious; he's going to sue the City Hospital. You just wait here a few minutes until he gets home; he's looking for you."

She repeated that she knew all about "psychosopy," and said that she had studied about her neurogastric nerve which was the cause of the gas on her stomach; that there was nothing the matter with her mind, because no one could have anything the matter with his mind if his ancestors were all right. There was not a blemish on her ancestors.

The student then asked to be allowed in the house so that he could talk with her, but she said: "No, indeed; I do not allow strange men in my house when my husband isn't here," and slammed the window.

Interestingly enough, the patient has no husband and she has a number of psychopathic antecedents in her family, two of whom are in a state hospital for the insane. This student is not likely to forget what a defense mechanism is and the resultant emotional reaction.

Recently, a large, obese Irish woman of 50, with ten children and sixteen pregnancies, was referred from the out-patient medical clinic to our department because she was worried and could not sleep. After the student had worked the case up and it was presented at staff conference, the patient was brought in for questioning. We told her that she really deserved a lot of credit for working and caring for her ten children while her husband was out of work, and that she should not worry over the gonorrheal infection which she claimed her husband gave her two weeks previously. We assured her that we could take care of that. The husband, in a previous interview with the student, accused the wife of contracting it and giving it to him. It was obvious that the husband was the cause of the infection and that he needed psychiatric treatment more than the wife. She was told we would be very glad to talk with the husband and see if we could straighten him out. When she said something about wanting a divorce, we referred her to the Legal Aid Society if she cared to consult them.

The patient went straight home and told her husband that she had been before a jury of doctors (six students and myself) and we had advised that she get a divorce. Furthermore, if he did not treat her better we (the jury of doctors) would lock him up and send him to the State Hospital. In about two hours' time a little, undersized, ineffectual looking Hebrew stormed into the office, white with rage, saying he was going to sue the hospital and the doctors for breaking up his home. He then went on a long tirade of how he could not possibly have given his wife gonorrhea, intimating that the only way he could have gotten it was from her.

He recalled that she was seen with this one and that one. He was obviously a paranoid individual. As soon as he heard what the doctors had really said and that they were not a jury and had no power to indict him in any way, he calmed down and went home. It would take too long to go into all the lessons learned from this one case, but this student is determined to win the confidence of this little man and get him into the Mental Hygiene Clinic for treatment.

A tall, lean Kentucky coal miner was sent to the psychopathic ward because he threatened to kill several people. A student went out on the case and found the wife utterly unable to care for the six children. He went to the social agencies and found that she had been given a mental test and was rated as an imbecile. He further found out that the baby of the family who had died two months previously in convulsions at the City Hospital had been exposed to lead fumes from automobile batteries which the father, our patient, was in the habit of burning for fuel. He also found out that this man had refused to allow the child to come to the Hospital until it was too late. This clinched the matter; we had evidence to commit the man to the State Hospital, and plans are now under way to send the mother to the feeble-minded institution and to place the children in a foster home.

This leads to the other routine procedure in the student's social case work, namely: routine visits to the social agencies. He finds out what agencies are active on the case by telephoning the Social Service Clearing House. He goes to the agencies, reads their records, consults with the social workers and comes back armed with additional information which helps considerably when the case is reviewed in the staff conference. Where further agency cooperation is needed to improve the social conditions, the student invites a member of the agency to attend the conference.

Excellent cooperation has been obtained on the part of the agencies in this work. They tell us that physicians seldom call on them and in general know very little of their work. The heads of these organizations have volunteered to show students about their offices and have outlined their particular service to the public. After returning from one of these visits, a student made the remark that he never knew these places existed, but that he knew now why we did not have more social unrest in this country during the depression. Such unsolicited remarks show that students are thinking to some extent in terms of social stress and strain.

Aside from the relief aspect of such organizations, students are greatly impressed with the amount of important information these agencies have compiled through the years on certain individuals and their families. Students frequently note how inadequate and one-sided their own histories are after they have obtained a long history from one of the social agencies. More than once has a student made the initial history taken by the intern on service look very strange when he revealed another set of facts taken from the agency records. The important point is that the student benefits by making these discoveries for himself.

We have outlined the two major procedures of our teaching program, namely: routine home visits and social agency contacts. Let us now examine the students' case work in greater detail and try to evaluate the procedures involved.

The first morning for each group assigned to the psychiatric service is devoted to an explanation of what is required and a discussion of the value to the general practitioner of understanding human relationships as shown by a first-hand study of the conditions in the family life of the patient. Each student is urged to avoid all situations that might embarrass the hospital or reflect in any way on the work. It is usually better for the student to go at once to the home of the patient as soon as he or she is admitted to the hospital and assigned. Relatives are usually more eager to cooperate at this time and expect less explanation and advice from the student. From the student's point of view, his mind at this time is more free to evaluate the physical and economic conditions of the home and the gross physical and mental abnormalities in other members of the family as they tell their story about the patient. The home visits should give the student a "feel" of the entire situation rather than a mere list of facts.

After the student has completed the physical examination and laboratory work, has taken the patient's own story, and has begun to evaluate the patient's mental status, he will have formulated for himself a number of concepts about the patient and his family. To this information is added whatever he can get from the social agencies. Then he is ready to interview relatives at the hospital to complete his history.

The case is finally summarized and presented at staff conference before the rest of the student group. Only one case is taken up at each hourly staff conference. The case summary is read in the first twenty minutes, the patient is

interviewed with the student group, and the case discussed for the remainder of the conference hour. The mechanisms involved, the diagnosis, treatment and recommendations are then dictated and added to the summary. Cases are not dropped after all this work is done on them, but treatment is carried on by various staff members in the psychiatric clinics. The student's name is written on the case record so that he can be notified of the results of treatment on his cases.

Junior medical students are assigned to the psychiatric service in groups of 15 for a period of about six weeks, 3 hours a day. Their work is confined for the most part to psychotic patients on the psychopathic wards (a forty-bed service of the 500-bed City Hospital).

Senior medical students are assigned to the psychiatric service in groups of 5 for a period of 2 weeks, 6 hours a day. Seniors work up cases of the milder nervous conditions such as adult psychoneuroses referred from the medical and surgical wards and behavior and personality problems of children referred from the pediatric service. More recently psychoneurotic cases from the out-patient clinics are being worked up by senior students.

Each student in his practical work studies thoroughly on an average of four psychotic cases during his junior service, four psychoneurotic cases during his senior service, and at least one maladjusted child. He also attends all the conferences on the other students' cases. In this way he is exposed to a rather wide range of conditions.

Several things have surprised us in this undertaking. No real complaints have reached us as to the conduct of students in the homes or at the hospital. A few students have failed to keep their appointments. In two instances we had to censure students for telling relatives that there was nothing wrong with the patients when it later turned out that they needed State Hospital care. However, on numerous occasions relatives have so appreciated a personal call from the doctor (student) that their attitude was completely changed toward the hospital. After the home visit, several difficult relatives were won over to the need for State Hospital commitment for the patient. Some of the relatives remarked that if the physicians on the psychopathic service were as interested as they appeared, they would cooperate in following the recommendations given. We had expected a marked reaction on the part of some students against these home visits, but each one declared it meant more to him in understanding the patient than any other procedure. They paid their own car fare and frequently made night calls to catch more members of the family at home.

It is our experience that students obtain much better cooperation from patients and relatives in their case studies when the patients are confined to the wards of the hospital. Out-patient work does not go on so smoothly. When patients are not confined to the wards, relatives do not seem to know what it is all about and oftentimes are not interested. Patients are generally hypersensitive and it is difficult to interview relatives with patients at home at the same time. We feel, however, that the senior medical students ought to have the experience of studying these outside patients. Working up the patients in the home and the difficulties they encounter teaches lessons that they will never forget. It is naturally better to have such lessons taught them when they have older staff men to consult about their mistakes. From the point of view of the patient and his relatives, only time will tell whether this outside work is going to increase or decrease their confidence in the hospital.

Some students are well endowed with innate tact and have a well developed sense of the eternal fitness of things. About one-fifth of the students have these qualities developed to a surprising degree. About one-fifth of them, however, seem deficient in these qualities. The rest seem to manage not too badly. To be sure, tact, good taste and discrimination cannot be taught in medical school, but it is to be hoped, nevertheless, that each student group will benefit by the manner in which the psychiatrists on the staff interview these patients in their presence. There are many practical points that students need to learn and can learn about the handling of nervous patients. So far as theoretical lectures in psychiatry are concerned, we feel that they do not stick unless appropriate cases are demonstrated to substantiate the theory. Inadequate lectures in the theory alone may prejudice students against psychiatry permanently. The average curriculum does not permit enough time to

cover the theory adequately and when it does the practical work is usually neglected. Of the two, certainly the practical work should have precedence. A few cases well worked up and thoroughly discussed can do no harm and ought to leave the student eager for more. It will give him a methodology of approach to the nervous patient which he can use in the future.

Our aim in this undergraduate teaching is not to develop psychiatrists. It is probably fortunate that medical students as a group are not too expert in abstract thinking. Medicine needs men endowed, if you will, with a constitution out of which is born a keen interest in objectivity. A course of this nature is designed to utilize these powers of observation not only in studying the individual patient's symptoms, both physical and mental, but also the causes of these symptoms in the stress and strain of his environment. The student does not need to be highly developed in abstract thinking to understand how long continued anxiety and tension can bring about physiological dysfunction such as tachycardia, distressing gastric symptoms, and so on. If a man is of feminine build and disposition, the average student can see how this can produce a feeling of inferiority to which the patient may be over-reacting, and this to the point of injuring his health by so-called masculine dissipations. However, to hold students accountable for remembering a course in psychological abstractions is neither wise nor desirable.

If, on the other hand, the average student is not exposed to enough practical studies in the social side of medicine, it is easy for him to become discouraged and later prejudiced because of his failure to understand. It almost seems as though a student either opens his mind to such things before he gets out of medical school, or he is likely to close it. If he keeps his mind open because his interest has been aroused, every patient he sees in the future will increase that interest. He is then likely to become more and more skilled in understanding disordered human relationships and their bearing on the individual's physical and mental state.

In short, we feel that each student should be given at least a glimpse of a man's relationship to his total environment, which is indeed the study of the nature of man himself.

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EFFECT OF LIVER TREATMENT ON PERNICIOUS ANEMIA

In 1927, when Minot and Murphy[1] reported improvement of symptoms and of the blood picture of pernicious anemia after a diet high in liver, a landmark was established in the conquest of disease. It appeared that this malady need no longer greatly distress mankind, would soon become negligible as a cause of death.

In the last eight years the disease has continued to be one of the most fruitful subjects for investigation. Various active liver concentrates have been prepared; stomach preparations have been shown to be effective in raising the blood count; liver digested in normal stomach juice to be a still better stimulant to blood formation; and even vitamin G digested in normal stomach juice has been added to the list of preparations active in correction of the blood picture. Studies on pernicious anemia have given a great stimulus to those on secondary anemia as well, since it was demonstrated that the latter condition does not respond to liver therapy.

Though the blood picture and many of the symptoms improve under what is considered adequate therapy, the achlorhydria which precedes the disease persists. Presumably the pathologic condition of the gastric mucosa is not corrected. As to whether the neurologic manifestations of the disease may be repaired, there have been numerous conflicting statements. Minot and Murphy, in their original description of 105 cases, declared that neurological symptoms did not develop, and existing symptoms did not progress, during liver treatment. They did not claim remission of this phase of the disease. There have been some reports of regression of cord symptoms and improvement of neural function during therapy. Other investigators have denied the occurrence of this favorable change. According to Grinker and Kandel,[2] of the University of Chicago, studies on the neurologic changes have been very inadequately made. Grinker and Kandel have themselves attempted to throw light on the question by careful and frequently repeated observations upon a group of fifty patients with pernicious anemia and combined degeneration of the spinal cord carefully treated by liver diet over a period of more than two years. The diagnoses were indubitable, they say, from the symptoms and blood smear. Their patients were first hospitalized for a month to control the blood picture. During the period of observation they consumed enough liver to maintain a normal red count, normal hemoglobin, and a feeling of well-being. Neurological examinations were conducted about once a month throughout the period.

Several groups of cases are discussed, depending upon the response to therapy. The first group showed a marked increase in general strength, but no improvement in the neurological signs such as the reflexes, or the vibration sense, which remained stationary. Other cases definitely became worse under treatment, new disabilities developing, with a serious progression of neurological signs. A patient lost the knee and ankle jerks in a period during which the blood count was high. In another case which was followed, the patient was uncooperative and took the diet very irregularly. His blood count remained low, but he showed no neurological deterioration. The peripheral nerve symptoms, Grinker and Kandel remind the reader, are to be differentiated from permanent cord symptoms. Dysesthesia, atrophic changes of the skin, certain sensory defects, and many mental symptoms improve as the anemia is corrected. Symp-

1. Minot, G. R.; and Murphy, W. P.: A Diet Rich in Liver in the Treatment of Pernicious Anemia. **89**:759-766, 1927.

2. Grinker, Roy R.; and Kandel, Ernestine: Pernicious Anemia: Results of Treatment of the Neurologic Complications. Arch. Int. Med., **54**:851, Dec., 1934.

toms of cord degeneration are never alleviated. In some cases, cord symptoms develop before there is any sign of blood dyscrasia.

In combined degeneration of the spinal cord, say the Chicago writers, the entire neuron is destroyed in small foci. The lesion is so severe that the possibility of its restoration is unthinkable. They suggest that as liver prolongs the lives of patients with pernicious anemia, the number of cases of degeneration of the cord will increase.

These studies direct attention to a less investigated field of study, the early diagnosis of spinal cord changes. The relation of these to the onset of achlorhydria may be enlightening.

THERAPY OF A FISH DERMATITIS

Experimental production of disease is usually easy and its treatment disappointing. In animal husbandry, the practical method of control of infection is by segregation of the diseased individuals, which are allowed to die, while a new and uninfected generation takes their place. Zobell and Weston,[1] of the University of California, have offered what appears to be a specific curative treatment of an infectious skin disease of fishes, which illustrates several therapeutic principles of possible clinical value.

One unacquainted with oceanography is surprised to learn that fish have skin diseases. Fish dermatology can certainly not be classed among the older sciences. According to the California investigators, a very prevalent and usually fatal ulcerative dermatitis is common among certain small fish of the Pacific coast. The lesions may be detected in four to eighteen hours after inoculation with the etiologic organism, *Achromobacter icthyodermis*. On the skin whitish spots appear, scales fall out, and the ulcer is seen. A liquefactive necrosis of the muscle occurs, which precedes the inward advance of the bacteria. Many areas of skin are involved, the bone is often laid bare, and the disease may be fatal within a week. In nature diseased fish are infrequently found, because of the rapidity with which the weakened members are destroyed by predatory fish around them.

Like many common human pathogens, *Achromobacter ichthyodermis* is pleomorphic. Though its form is characteristic when it is freshly isolated, it may appear as a coccus or in several other shapes after a few transfers on laboratory media, after which also its infectivity diminishes. It does not thrive at temperatures in excess of 30 degrees Centigrade. At 40 degrees it dies in ten minutes. (It will be recalled that 37 degrees Centigrade is the normal body temperature for man.) Below 15 degrees it loses its infectivity.

The average survival time of fish with this dermatitis varies with the temperature at which they are kept. Death is most rapid if the environment is maintained at 25 degrees; a rise of 5 degrees greatly decreases the mortality rate. A means of eliminating the infection therefore presented itself by raising the temperature of the surrounding water, if the fish themselves could exist at the higher temperatures. Healthy fish die in two to fifteen minutes if they are transferred directly from an environment of 16 to 18 degrees into one of 30 to 35, the temperature which is injurious to the bacillus. If the water is slowly warmed during a period of twenty-four hours, they will tolerate 30 degrees (about 86 degrees Fahrenheit) without apparent discomfort. Acclimatized to 32 to 35 and kept at this temperature, they rapidly and completely recover from the dermatitis, the skin heals, and they possess an immunity to infection for some weeks. Large lesions extending to the bony structures completely disappear in a week after acclimatization to 35 degrees. A complication lies in the danger of acclimatizing the pathogenic organism first, since a generation of the bacilli develops in less than fifteen minutes.

The hyperthermia treatment, according to Zobell and Weston, involves a race between two antagonistic phenomena: the acceleration of the infection rate by warming the fish from 15 degrees to 30; and the stimulation of the immunity mechanisms of the host as the temperature of 30 to 35 is reached. If the process of acclimatization is too slow, infection will be favored and the fish may die. If it is too rapid, the heat may itself be lethal to the fish. Practically all the fish subjected to this treatment recovered from the disease and developed a considerable resistance. According to the California workers, this offers a satisfactory means of controlling a highly fatal disease which is often encountered in aquariums.

This conquest of a bacterial disease is of interest particularly in connection with the recent popularity of diathermy and of fever treatment by malaria inoculations, as for lues. The elaborate experimentation to determine the effective temperature after the cause of the disease was

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1. Zobell, Claude E.; and Weston, N. A.: An Infectious Dermatitis of Certain Marine Fishes. Jour. Infect. Dis., **55**:289, 1934.

known, the narrowness of range of therapeutic temperature, the fact that it lay below the lethal point for the micro-organism, are all points worthy of consideration. Bacteria of course vary greatly in their susceptibility to heat; some thermophiles will flourish at 50. The human pathogens are frequently heat-labile.

Disinfection was simplified by the fact that this is a skin disease, acting only upon the superficial tissues. The micro-organisms were not buried in the vital organs, and even in the skin were not intracellular.

GLEANINGS FROM RECENT JOURNALS

Flagella-Like Processes of Human Red Blood Cells.—Reports have appeared upon filaments, or flagella-like processes to be seen in fresh and stained specimens of human red blood cells. According to Oliver,[1] they have a whip-like or undulatory motion. They may, after detachment from the cell, be mistaken for spirochetes. The erythrocytes with these processes are freely motile.

According to Auer,[2] they are fibrils twisted about one another. They may arise from the platelets. They are usually placed at opposite ends of the cell, and he suggests that they are responsible for the red cell deformation in sickle cell anemia.

Stimulation and Inhibition of Malignant Tumors.—Never have research and investigation upon medical subjects been more active than today, if one may judge by the literature available. Cancer is perhaps the most studied of all human ailments and investigations on it are conducted in many special fields. Reports on the role of the endocrines in cancer have accumulated rapidly. Because malignant growths develop most frequently in persons of middle life, at the period of sexual change, the effects of the secretions of the sex glands, the gonads and anterior pituitary, have been of particular interest. Pregnancy urine is the most abundant source of these, but normal urine apparently contains hitherto unsuspected excretory products of this nature. A secretion of the testicle is said to increase the rate of spreading in animals of certain strains of experimental cancer. An impurity associated with prolan of pregnancy urine inhibits the growth of a transplantable mouse tumor.[1] A crude colloid fraction of normal urine, according to Bischoff and Maxwell,[1] of Santa Barbara, contains a substance or substances capable of breaking down resistance to inoculated tumors, and of increasing the rate of tumor growth.

Inorganic Salts in Nutrition.—The quantity of many of the inorganic salts necessary to normal development has been studied and minimums in the case of calcium, sodium and many others have been established. The effects of total deprivation of a single mineral element, such as the above or magnesium, iron, manganese and many others have been described. A group of investigators[2] from Yale University have studied the effects on rats of a diet containing very nearly no inorganic elements. Each animal received less than 50 milligrams of mineral per day, an almost negligible quantity.

The adaptive changes in the effort to make existence possible are reported. There was an immediate retardation of growth, which continued slow for seven weeks, then ceased entirely, though the animals lived another six weeks. There was an increased excretion of ammonia in the urine, apparently an attempt to conserve fixed base. Ammonia (NH_3) substituted for such alkaline minerals as sodium and calcium, which the urine ordinarily contains. Mineral excretion was extremely low. There was a gradual loss of calcium from the bones. But the electrolyte balance of the blood serum remained essentially normal in the face of these extremely unfavorable dietary conditions.

At autopsy, a striking loss of body fat was noted. There was little if any change in the total ash. The calcium and phosphorus of the ash were reduced. The proportion of sodium chloride of the body was not lowered, in spite of the almost total absence of these ions from the diet.

The conservation of inorganic material in this condition of deprivation attests the remarkable adaptability of the living organism to an overwhelmingly deficient ration. The loss of body fat emphasizes the dependence of weight maintenance upon other elements than fat and carbohydrates.

1. Oliver, W. W.: Staining of the Processes (flagella) of Human Erythrocytes. Jour. Infect. Dis., **55**:267, 1934.

2. Auer, John: Structure and Function of Filaments Produced by Living Red Blood Cells. Amer. Jour. Med. Sci., **186**:776, 1933.

1. Bischoff, Fritz; and Maxwell, L. C.: Hormones in Cancer. IX. A Resistance Factor in Normal Urine Affecting Carcinoma 256. Jour. Pharmac. & Exper. Ther., **52**:378, Dec., 1934.

2. Smith, A. H.; and Smith, P. K.: Inorganic Salts in Nutrition: Electrolyte Balance in the Serum of Rats Receiving a Diet Deficient in Inorganic Constituents. Jour. Biol. Chem., **107**: 681, Dec., 1934.

Light, A. E.; Smith, P. K.; Smith, A. H.; and Anderson, W. E.: Changes in Composition of Whole Animals Induced by a Diet Poor in Salts. Ibid, p. 689.

TWENTY-FIVE YEARS AGO
FROM JOURNALS OF 1910

Transfusion for Pellagra.[1]—"* * * It was not until the present surgical renaissance that the operation [transfusion] attained the rational and accepted status that it holds today. The names of Carrel, of New York, and Crile, of Cleveland, deserve to be identified with this excellent and often valuable operation. It consists of uniting the radial artery of one individual to any vein in the forearm of another person, and allowing the blood of the first to flow by its own arterial pressure into the second individual. * * * It is at best a delicate operation and should be performed with a full knowledge of the dangers to both giver and to the receiver.

"* * * Lombroso, in a personal communication to the authors, * * * states that the use of serum is of undoubted value in the treatment of pellagra. * * * ultimately there will be established a serum treatment for this disease. Until the serum therapy is established transfusion * * * may be the means of transferring a natural or acquired immunity."

Mortality from Operations for Cancer of the Stomach.[2]—"The prevalence of stomach cancer is very great, and on the increase. * * * The Mayos report 29 per cent of 150 cases operated upon alive and well over three years. * * *

"Eighty per cent have a chance of immediate recovery from operation.

"Twenty per cent have the chance of being alive and well for three years.

"Ten per cent have a chance of permanent cure, i. e., to live over five years.

According to Dr. W. J. Mayo: " 'Exploratory incision is the only way an early diagnosis of cancer of the stomach can be established.' "

Upton Sinclair and Germophobia.[3]—"The development of the science of bacteriology has given rise to a new type of phobia, the dread of microbes * * * popular writing * * * usually exaggerates the obvious trend of science, and a typical example of this exaggeration is to be found in the recent book by Mr. Upton Sinclair and Mr. Michel Williams on 'Good Health and How We Won It' * * * by cutting meat out of their dietary. They proceed to show that * * * an ordinary specimen of sirloin steak * * * contained nearly four hundred million anaerobic germs per gram of moist material. This was, however, 'not a counter' to what was found in other materials, fish and flesh. * *

" 'Life is a dangerous thing at best and very few of us get out of it alive' * * * Health * * * can be preserved, in part, by cultivating a due measure of indifference to inevitable dangers."

1. Cole, H. P.; and Withrop, G. J.: Conclusions Drawn from Transfusions in Ten Cases of Pellagra. Gulf States Jour. Med. & Surg., **16**:20, 1910.

2. Editorial, "What Can be Done Surgically for the Cure of Cancer of the Stomach?" Sou. Med. Jour., **3**:138, 1910.

3. Editorial, Germophobia. J.A.M.A., **54**:135 1910.

Book Reviews

Body Mechanics in the Study and Treatment of Disease. By Joel E. Goldthwait, M.D., LL.D., Member of Board of Consultants, Massachusetts General Hospital; and Lloyd T. Brown, M.D., Instructor in Orthopedic Surgery, Harvard Medical School; Loring T. Swaim, M.D., Instructor in Orthopedic Surgery, Harvard Medical School; John G. Kuhns, M.D., Assistant in Orthopedic Surgery, Harvard Medical School. 281 pages, illustrated. Philadelphia: J. B. Lippincott Company, 1934. Cloth, $4.00.

This book, dedicated to the chronic patient, calls attention to the slow advance in understanding of chronic diseases during the past generation and the average physician's lack of knowledge and interest in the subject. The relationship between improper posture and systemic disease is dealt with and a new line of study and treatment of chronic disorders by correction of faulty body mechanics is suggested.

The slender, stocky and heavy body types with their characteristic postural and physiological differences and the pathologic changes to be expected from postural defects are described. The visceral, bony, circulatory and nervous system diseases resulting from faulty body posture, and their treatment by correction of this defect through muscle reeducation, exercise and braces is thoroughly dealt with.

The last section is devoted to illustrative cases of different diseases having one thing in common, faulty body mechanics. All cases showed definite improvement as a result of correction of the body mechanics as a whole.

Inasmuch as chronic disease offers a challenge to the medical profession from the fact that they exhaust nature's reserves, the authors conclude that correction of faulty body mechanics will result in fewer so-called helpless or hopeless cases of chronic disease.

The 1934 Year Book of General Medicine. Edited by George F. Dick, M.D.; Lawrason Brown, M.D.; George R. Minot, M.D., S.D., F.R.C.P., (Hon.) Edin.; William B. Castle, M.D., A.M.; William D. Stroud, M.D.; George B. Eusterman, M.D. 843 pages, illustrated. Chicago: The Year Book Publishers, 1934. Cloth, $3.00.

This book furnishes an excellent review of the advance of general medicine during the past year. Among the articles picked at random through the pages is one on the method of cooperation that has been worked out by the Detroit Health Department and the physicians in that vicinity. Another is the chemical spot test for urea that can be done at the bedside in one minute (page 452). A number of articles appear on abnormal respiration. Several writers advocate total ablation of the thyroid in the treatment of angina pectoris and congestive heart failure. John Parkinson (London) gives a very full description of radiology, especially radioscopy in heart disease, that should be read by anyone treating the cardiovascular system. Iodine is shown by J. H. Means to be an aid in the diagnosis of thyrotoxicosis. The volume should be perused a few pages at a time and referred to when cases come under observation to be of the greatest service. The new cover is much more attractive than the old.

Applied Anatomy. The Construction of the Human Body Considered in Relation to its Functions, Diseases and Injuries. By Gwilym G. Davis, M.D., Late Professor of Orthopedic Surgery and Associate Professor of Applied Anatomy in the University of Pennsylvania. Ninth Edition. Reset, reillustrated and completely revised by George P. Muller, M.D., Professor of Clinical Surgery, Graduate School of Medicine, University of Pennsylvania; Surgeon to the Misericordia and Lankenau Hospitals; Assisted by: Bernard J. Alpers, M.D., Assistant Professor of Neurology, Graduate School of Medicine; Neurologist to the Philadelphia General and Pennsylvania Hospital: Robert A. Kimbrough, Jr., M.D., Associate in Obstetrics and Gynecology, University of Pennsylvania; Assistant Gynecologist, University Hospital; Obstetrician, Pennsylvania Hospital: Stirling W. Moorhead, M.D., Assistant Professor of Urology, University of Pennsylvania; Urologist to the Methodist Episcopal Hospital: I. S. Ravdin, M.D., Professor of Surgical Research, University of Pennsylvania; Surgeon to the University Hospital: S. Dana Weeder, M.D., Surgeon to the Germantown Hospital; Assistant Surgeon to the Chestnut Hill Hospital. 717 pages with 674 illustrations. Philadelphia: J. B. Lippincott Company, 1934. Cloth, $9.00.

This unique text has gone through a number of editions and is as popular as ever. Dr. Davis pointed out in the first edition that "it is not the object of this work to teach plain anatomical facts; its aim is to show the relation of structure to function." Fundamental anatomy is given briefly, then the structure in relation to its functions is considered, and finally the pathology of that part in relation to its structure is discussed. B. N. A. nomenclature has been used more frequently than before, but not exclusively, as many physicians cling to the older terminology.

Definite Diagnosis in General Practice. By W. L. Kitchens, M.D. With a Foreword by John H. Musser, B.S., M.D., F.A.C.P.; Professor of Medicine in the Tulane University of Louisiana School of Medicine. 445 pages. Philadelphia, Pennsylvania: W. B. Saunders Company, 1934. Cloth, $10.00.

This book designed by Dr. Kitchens offers a new method in the making of differential diagnoses and for finally arriving at a correct diagnosis by the eliminative method. At first glance the procedure appears cumbersome, but in a few minutes the user will be gratified at the ease with which he can secure the necessary information. Four hundred and seven diseases which are often found in general practice are considered. The first part of the book contains their symptoms listed in alphabetical order. In part two are given the diseases in alphabetical order with the diagnostic symptoms listed, as subjective, objective and laboratory findings; also a disease index. Each symptom or disease is listed on a single page, so that if one wishes to find with what diseases a certain symptom may be found he looks in part one and finds listed under this symptom the diseases and their page number in part two. The procedure is reversed in case a disease is suspected and the differential is to be worked out. The author has drawn on a varied list of sources and gives the atypical symptoms as well as the typical. Space has also been left at the bottom of each page so that the physician can append his own experiences and thus increase the value of the text. Continued use of this text by the tyro and older practitioner will develop diagnostic acumen and lead the way to the unraveling of difficult diagnoses.

Manual of Clinical Laboratory Methods. By Pauline S. Dimmitt, Ph.G., Medical Technologist for the Stout Clinic, Sherman, Texas; Former Instructor in Biological Chemistry, University of Texas School of Medicine, and Medical Technologist in the Pathological Laboratory, John Sealy Hospital, Galveston, Texas. 156 pages, illustrated. Philadelphia: F. A. Davis Company, 1934. Cloth, $2.00.

Although the author of this volume omits all other methods of technic except those that she uses herself, the book appears to be most practical and excellently compiled. The manual will be found to be of great assistance to the office technician and to any physician performing his own laboratory tests. Some of the illustrations used have been taken from other laboratory manuals.

This book is worthy of endorsement for its brevity. It is not extensive enough for an expert pathologist's use.

Postures and Practices During Labor Among Primitive Peoples. By Julius Jarcho, M.D., F.A.C.S., New York. 175 pages, illustrated. New York: Paul B. Hoeber, Inc., 1934. Cloth, $3.50.

This book of Dr. Jarcho presents an interesting study to practitioners of obstetrics. Within the book are discussed the influences of customs and taboos of the primitive peoples on modern obstetrics. And what physician cannot give testimony to many that he has seen in his practice? A few pages are devoted to the effects of race and environment upon parturition. A chapter on postures covers over half of the text. The writer points out the adaptions that have been made from these primitive postures and depicts a great many of them by illustration. The last chapter gives the reader an exhaustive survey of postpartum gymnastics and should prove valuable in practice. The excellent printing of Paul Hoeber adds greatly to this contribution to obstetric knowledge.

Diseases of the Skin. A Handbook of Dermatology for Practitioners and Students. By S. Ernest Dore, M.A., M.D. (Camb.), F.R.C.P. (Lond.), Consulting Physician for Diseases of the Skin, St. Thomas Hospital, Westminster Hospital and the Evelina Hospital for Sick Children; and John L. Franklin, M.A., M.D. (Camb.), M.R.C.P. (Lond.), Assistant Physician for Diseases of the Skin, Westminster Hospital. 410 pages, illustrated. New York: D. Appleton-Century Company, 1924. Cloth, $5.00.

This volume was started as a revision of Sir Malcolm Morris's "Diseases of the Skin," but the inclusion of new material was so great that only the original pattern and a number of the illustrations are retained. In the first few pages are discussed the anatomy of the skin, types of eruptions and the principles of diagnosis. Then follow brief and well written descriptions of diagnosis, etiology, symptomatology and treatment of the commoner skin lesions. The rarer lesions are given sufficient mention for diagnosis. The authors have avoided the use of proprietary names for drugs which often fill the pages of books written abroad. It is to be recommended as a short, conservative textbook of dermatology.

A Manual of the Practice of Medicine. Prepared Especially for Students. By A. A. Stevens, A.M., M.D., Formerly Professor of Applied Therapeutics in the University of Pennsylvania. Thirteenth edition, revised. 685 pages. Philadelphia: W. B. Saunders Co., 1934. Cloth, $3.50.

This elementary text-book of medicine, now in its thirteenth edition, is no larger than its predecessors. A number of new subjects, as megacolon, toxic cirrhosis of the liver, arteriolo-sclerotic nephritis, agranulocytic angina, hyperadrenalism, acute coronary occlusion, epidermophytosis, arterial hypotension, have been added. It is satisfactory for quick reference or review, but lacks details.

Sex Hygiene. What to Teach and How to Teach it. By Alfred Worcester, A.M., M.D., Sc.D., Henry K. Oliver Professor of Hygiene, Harvard University. 134 pages. Springfield, Illinois: Charles C. Thomas, 1934. Cloth, $2.50.

Dr. Worcester has collected a number of his lectures into book form. The first, "The Prevention of Sexual Troubles," was given thirty-five years ago; the others are more recent. All are still applicable. The talks have been given to various audiences of both sexes and are time-tried.

Southern Medical News

SOUTHEASTERN SURGICAL CONGRESS

Southeastern Surgical Congress, membership made up of surgeons of Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Virginia, will hold its sixth annual assembly at Jacksonville, Florida, Monday, Tuesday and Wednesday, March 11, 12, 13, at the Mayflower Hotel. Clinical and round table discussions will be conducted daily. The annual banquet will be on Tuesday evening. Dr. Gerry R. Holden, Jacksonville, Florida, is President, and Dr. B. T. Beasley, Doctors' Building, Atlanta, Georgia, is Secretary.

DALLAS SOUTHERN CLINICAL SOCIETY

The Dallas Southern Clinical Society will hold its seventh annual clinical conference at Dallas, Texas, March 18-22, at the Baker Hotel. Lectures, clinics, clinical conferences and round table luncheons held daily. Dr. Curtice Rosser is President, Dr. John L. Goforth is Chairman Executive Committee, Dr. David W. Carter, Jr., is Director of Clinics, and Dr. Jo C. Alexander, 1414 Medical Arts Building, Dallas, Texas, is Secretary.

MID-SOUTH POSTGRADUATE MEDICAL ASSEMBLY

The Mid-South Postgraduate Medical Assembly, fifty-first annual meeting, will be held at Memphis, Tennessee, Tuesday, Wednesday, Thursday, and Friday, February 12, 13, 14, 15, at the Hotel Peabody. Clinical lectures and round table discussions each day. Dr. P. W. Rowland, Oxford, Mississippi, is President, and Dr. A. F. Cooper, Goodwyn Institute Building, Memphis, Tennessee, is Secretary.

AMERICAN COLLEGE OF SURGEONS

The annual sectional meeting of the American College of Surgeons, states of Alabama, Florida, Georgia, Louisiana, Mississippi and Tennessee, will be held at Birmingham, Alabama, Thursday and Friday, March 7 and 8, Tutwiler Hotel. Hospital clinics in the forenoon and clinical lectures in the afternoon at the Tutwiler Hotel. Banquet Thursday evening, and a community health meeting on Friday evening. Medical moving pictures each day during the lunch hour. Dr. J. M. Mason, Medical Arts Building, Birmingham, is local Chairman.

ALABAMA

The Geneva County Health Department has been discontinued by the Board of County Commissioners. Dr. Lucius S. Nichols was County Health Officer.

Dr. James S. Hough, Livingston, Sumter County Health Officer, has been made District Medical Superintendent in charge of eleven counties, effective December 1.

Dr. Henry T. Donovan, Marion, was appointed Health Officer of Shelby County to succeed Dr. John M. Kimmey, of Columbiana.

L. V. Phelps, a graduate of Boston University and formerly Statistician with the New York State Health Department, has been appointed Statistician of the State Health Department, to succeed Dr. W. T. Fales, who resigned to accept a similar position with the Health Department in Baltimore.

Dr. Lucian Newman, Health Officer of Jackson County, recently resigned to enter private practice in Dadeville. He was succeeded by Dr. Edward A. Thorne, Fairfield.

Dr. James M. Mason, Birmingham, gave the ninth Stanford E. Chaille Memorial Oration entitled "Stanford Emerson Chaille as a Student Viewed Him," at the meeting of the Orleans Parish Medical Society in New Orleans, December 5.

Dr. Aubrey Bernard Lee, Birmingham, and Miss Ruby Nelle Parmer were married November 19.

DEATHS

Dr. William Marcus Peters, Northport, aged 52, died October 19 of coronary occlusion.

Dr. Alonzo K. Collins, Birmingham, aged 62, died suddenly October 30 of heart disease.

Dr. James C. Pennington, Andalusia, aged 72, died September 25.

Dr. Daniel Porter Mixson, Headland, aged 54, died November 9 of cerebral hemorrhage.

Dr. William Brooks Turner, Florence, aged 56, died November 28 of pneumonia.

Dr. Thomas Elbert Rushing, Ramer, aged 68, died in October in Eureka, Texas.

Dr. John Aaron Kendrick, Greenville, aged 62, died in November.

Dr. Howell Lea Castleman, Sylacauga, aged 63, died November 24 of heart disease.

ARKANSAS

Dr. and Mrs. B. B. Bruce, Alma, entertained the members and guests of the Crawford County Medical Society at dinner on December 18. The Society elected the following officers for 1935: President, Dr. S. K. Kirkland, Van Buren; Vice-President, Dr. Q. R. Galloway, Alma; and Secretary-Treasurer, Dr. B. B. Bruce, Alma.

The Drew County Medical Society has elected the following officers for 1935: President, Dr. A. S. J. Collins; Vice-President, Dr. G. E. DeBolt; and Secretary-Treasurer, Dr. J. S. Wilson.

The Independence County Medical Society met December 10 at Batesville in dinner session and officers elected for 1935 were: President, Dr. V. D. McAdams; Vice-President, Dr. C. A. Churchill; Secretary-Treasurer, Dr. M. S. Craig.

The Lawrence County Medical Society met November 13 as the guests of Drs. Cruse and Tibbels at Black Rock. After a scientific session dinner was served.

The Lincoln County Medical Society has elected the following officers for 1935: President, Dr. C. W. Dixon, Gould; Vice-President, Dr. R. L. Johnson, Grady; Secretary-Treasurer, Dr. Vernon Tarver, Star City.

The Mississippi County Medical Society has elected the following officers for 1935: President, Dr. R. L. Johnson; Vice-President, Dr. W. M. Owen; and Secretary-Treasurer, Dr. F. D. Smith.

The Pulaski County Medical Society honored Dr. F. O. Mahony, President of the Arkansas Medical Society, at a dinner meeting November 19.

The Sebastian County Medical Society elected the following officers for 1935 at their meeting December 11: President, Dr. F. H. Krock; Vice-President, Dr. J. H. Buckley; Secretary, Dr. L. M. Henry; Treasurer, Dr. W. R. Brooksher.

The Washington County Medical Society has elected the following officers for 1935: President, Dr. A. A. Gilbert; Vice-President, Dr. J. M. Wallace; Secretary-Treasurer, Dr. Fount Richardson.

The Fort Smith Clinical Society held its twelfth meeting November 22, at which time a program of operative and dry clinics and round table luncheon talks was presented.

Continued on page 24

VITAMINS

CONTAINED IN BREWERS' YEAST ARE NECESSARY FOR NORMAL FUNCTION of GASTRIC GLANDS

In experiments by WEBSTER AND ARMOUR on Vitamine-B and gastric secretion, they state: (Proc. Exp. Biol. & Med., Jan. '34) "Administration of powdered brewers' yeast restored the normal secretory activity of the stomach in 3 days. This indicated that for the normal activity of the gastric glands it is necessary that the vitamins contained in yeast, presumably vitamin B complex, be present in the body."

PEMBERTON & OSGOOD (Chronic Arthritis—MacMillan & Co., 1934) state that . . . "there is general agreement that lack of vitamin B in animals leads to, among other changes, atrophy of the mucous and muscular layers of the gastro-intestinal tract . . ."

BREWERS' YEAST-HARRIS

is a remarkably pure culture of brewers' yeast. It is a dry, pasteurized powder, prepared especially for medicinal use that will not ferment in the stomach. It keeps indefinitely at room temperature and is delicious to the taste. It can be taken with regular food, mixed with milk or fruit juice or sprinkled on cereal.

YEAST VITAMINE-HARRIS TABLETS

contain the concentrated Vitamine-B from Brewers' Yeast-Harris. They are small, convenient and *contain* a known amount of *Vitamine-B complex*. They were the *first* Yeast Vitamine-B tablets made in America and still are the only *concentrated* Yeast Vitamine-B tablet for clinical use.

Prepared by

THE HARRIS LABORATORIES, Inc.

TUCKAHOE, NEW YORK

Continued from page 196

The Third Councilor District Medical Society has elected the following officers for 1935: President, Dr. Ruffin Longest, Wynne; Vice-President, Dr. S. S. Beaty, England; Secretary-Treasurer, Dr. J. O. Rush, Forrest City.

The Fourth Councilor District Medical Society met at Monticello December 3 in dinner session.

The Eighth Councilor District Medical Society met December 5 at Little Rock, at which time morning clinical sessions were conducted at St. Vincent's Infirmary. The following officers were elected: President, Dr. H. E. Mobley, Morrilton; Vice-President, Dr. L. Gardner, Russellville; Secretary-Treasurer, Dr. Alan G. Cazort, Little Rock.

Dr. T. C. Watson, former Director of the Saline County Health Department, will enter into private practice. He has been succeeded by Dr. Cad A. Henry, Clarendon.

Drs. H. H. McAdams and R. H. Willett have erected a fourteen-room clinic building for their use at Jonesboro.

Dr. R. A. Milliken, formerly of Indianapolis, is associated with Dr. Val Parmley, Little Rock.

The Tulane University Chapter of Omicron Delta Kappa, national honorary leadership fraternity, has elected Dr. H. H. Smith, Fort Smith, an honorary member.

Deaths

Dr. Charles Edward Park, DeWitt, aged 57, died in a Memphis Hospital November 20.

Dr. Elam Hensley Stevenson, Fort Smith, aged 78, died November 20 following a heart attack.

DISTRICT OF COLUMBIA

The Louis Mackall Medical Society has elected the following officers for 1935: President, Dr. Alan J. Chenery; Vice-President, Dr. Aubrey D. Fischer; Secretary-Treasurer, Dr. Robert M. Bolton.

Osler Medical Society has elected the following officers for 1935: President, Dr. John Minor; Vice-President, Dr. F. R. Sanderson; Secretary-Treasurer, Dr. E. Kirby-Smith.

The American Society for the Study of Arthritis, Incorporated, held sessions at the Hotel Shoreham in early December, at which time round table discussions on the various phases of arthritis were presented.

Dr. William C. Fowler was given a token of regard and esteem by his fellow workers and friends on his 70th birthday in November.

The following committee has been announced by the Commissioners of the District of Columbia for the purpose of selecting a successor to Dr. William C. Fowler, District Health Officer: Dr. William Gerry Morgan, Chairman; Dr. C. Willard Camalier, Dr. William H. Hough, Dr. Earl B. McKinley, Dr. W. F. Draper, Dr. Numa P. G. Adams, and Dr. E. C. Wiggins.

Dr. Philip A. Caulfield and Miss Grace Tumulty were married September 22.

FLORIDA

The Dade County Medical Society elected the following officers at the December meeting: President, Dr. W. W. McKibben; Vice-President, Dr. M. Jay Flipse; Secretary, Dr. Robert T. Spicer; Treasurer, Dr. H. A. Barge.

The Duval County Medical Society elected the following officers at the December meeting: President, Dr. E. T. Sellers; Vice-President, Dr. B. F. Woolsey; Secretary, Dr. Charles B. Mabry; Treasurer, Dr. J. W. Hayes.

The Florida Midland Medical Society elected the following officers in October: President, Dr. Robert C. Black, Plant City; First Vice-President, Dr. W. E. Sinclair, Orlando; Second Vice-President, Dr. R. L. Hughes, Bartow; Secretary-Treasurer, Dr. H. O. Brown, Tampa.

The Pinellas County Medical Society elected the following officers at its annual meeting held in St. Petersburg early in October: President, Dr. W. W. Harden, St. Petersburg; First Vice-President, Dr. W. D. Anderson, Largo; Second Vice-President,

Continued on page 26

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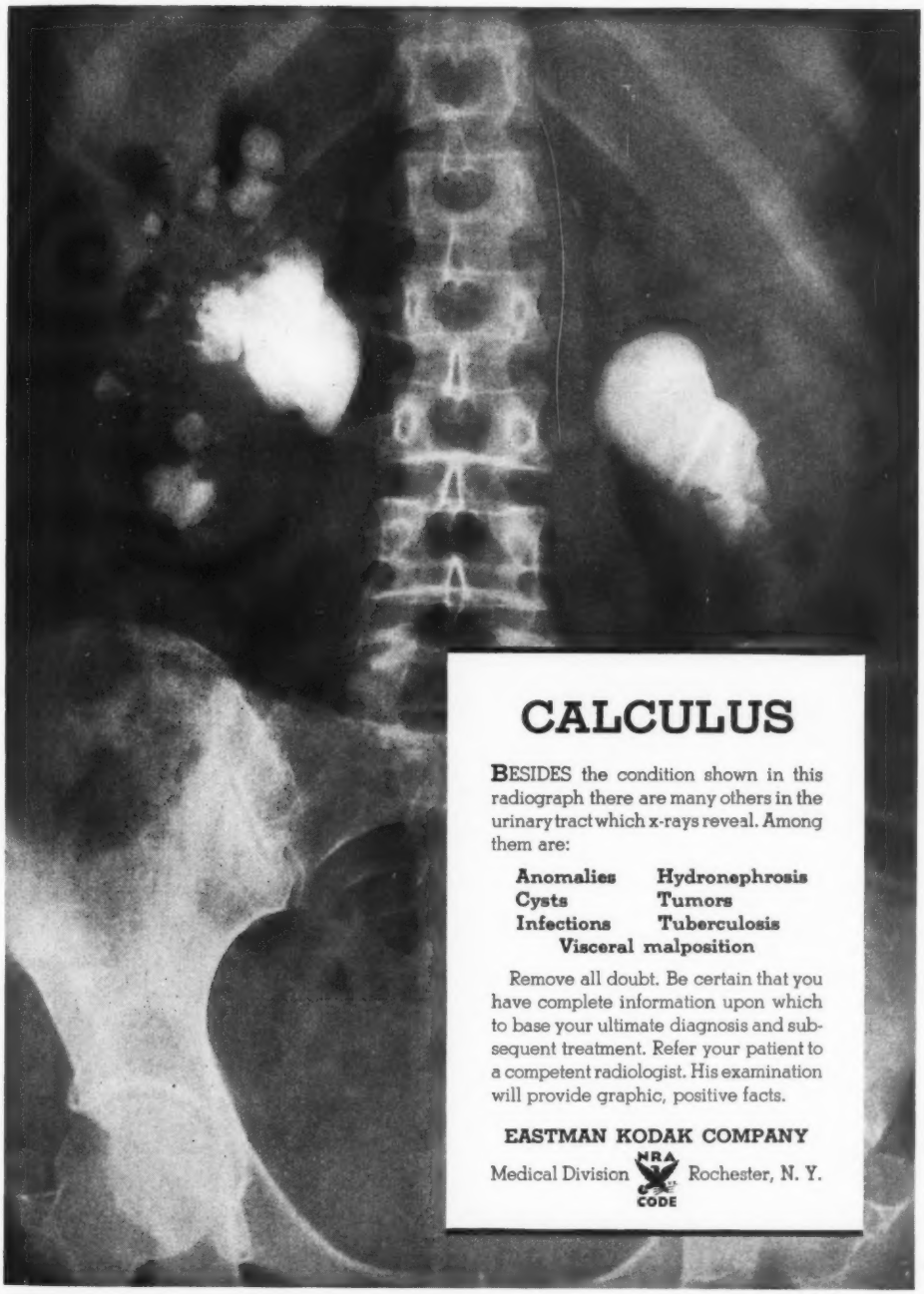
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Continued from page 24

Dr. J. A. Hardenbergh, St. Petersburg; Secretary, Dr. O. O. Feaster, St. Petersburg; Treasurer, Dr. W. C. McConnell, St. Petersburg.

Dr. C. E. Tumlin, of Miami, has been appointed a member of the State Board of Medical Examiners.

The Volusia County Medical Society honored Dr. and Mrs. George A. Davis, Deland, at a regular meeting on their fiftieth wedding anniversary.

Dr. Claude Anderson, of Dade City, has moved to Orlando and opened offices in the Exchange Building.

Dr. Lloyd J. Netto, of West Palm Beach, spent some time during the month of September at the Mayo Clinic in Rochester and the Vanderbilt Hospital in Nashville.

Dr. Walter Harris Ketchum, Jr., Jacksonville, and Miss Dorothy Alice Dodd were married October 13.

Deaths

Dr. Nicholas N. Jensen, Orlando, aged 71, died October 27 of pernicious anemia.

Dr. Albert A. Dye, DeFuniak Springs, aged 89, died November 24 in Asheville, North Carolina, of carcinoma.

Dr. Samuel Mowbrey Hammond, St. Petersburg, aged 64, died November 20 of coronary thrombosis.

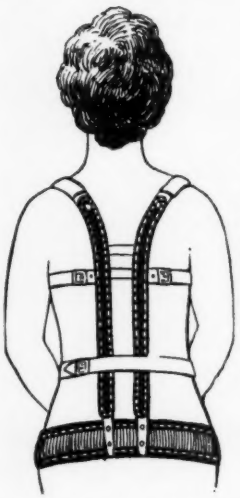
Dr. Arthur Henry Stafford, Orlando, aged 53, died November 8 of cerebral hemorrhage.

GEORGIA

The American Urological Association, Southeastern Branch Society, at the organization meeting in Atlanta on December 7 and 8 elected the following officers: Dr. Edgar G. Ballenger, Atlanta, President; Dr. W. E. Walther, New Orleans, President-Elect; and Dr. Earl Floyd, Atlanta, Secretary-Treasurer. Next annual meeting will be held in Nashville.

The Associated Anesthetists of the United States and Canada elected Dr. T. J. Collier, Atlanta, President, at a recent meeting held at Boston.

The Randolph County Medical Society, in cooperation with the Georgia Pediatric Society, gave a Child Welfare program at Cuthbert on December 6.



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Dr. Joseph C. Akerman and Dr. H. P. Harrell, Augusta, were speakers at a meeting of the Baldwin County Medical Society in cooperation with the Georgia Pediatric Society at Milledgeville in November.

The Fulton County Pediatric Society elected the following officers for the ensuing year: President, Dr. Joseph Yampolsky, Atlanta; Vice-President, Dr. Donald F. Cathcart, Atlanta; Secretary-Treasurer, Dr. T. I. Willingham, Atlanta.

The Georgia Pediatric Society held its second annual scientific meeting in Atlanta December 13.

Dr. Walker L. Curtis, son of the late Dr. C. M. Curtis, of College Park, and who has been engaged in practice at Sparks, announces the opening of offices in College Park.

The American College of Surgeons, at a recent meeting of the Clinical Congress of the College held at Boston, elected Dr. Hulett H. Askew, Atlanta, to fellowship.

Dr. J. Victor Roule, practice limited to diseases of the eye, ear, nose and throat, has opened offices in the Southern Finance Company Building, Augusta.

Dr. J. H. Kite, practice limited to orthopedic surgery, has opened offices in the Doctors Building, 478 Peachtree Street, Northeast, Atlanta.

Dr. Douglas B. Kendrick, Jr., Atlanta, and Miss Dorothea B. Reynolds were married November 17.

Dr. Robert Graham Ferrell, Jr., Milledgeville, and Miss Nida McGehee were married November 3.

Deaths

Dr. Oscar Frederick Collum, McRae, aged 52, died November 14 of heart disease.

Dr. Francis Marion Hubbard, Commerce, aged 78, died November 9.

Dr. Linus M. Ellis, Washington, aged 56, died suddenly November 1.

Dr. William Harry Sutton, Midville, aged 51, died suddenly October 31.

Dr. Lemuel Eugene Thornton, Riceboro, aged 58, died October 1.

Dr. Charles Lee Bond, Hartsfield, aged 68, died in November of pneumonia.

Dr. Andrew J. Bowen, Portal, aged 55, died recently of angina pectoris.

Dr. William H. Harris, Athens, aged 67, died November 12 of injuries received in an automobile accident.

Dr. John W. Buchanan, Folkston, aged 73, died in November.

KENTUCKY

Dr. John Smith Newman, McRoberts, and Miss Billie Sue Brae were married November 18.

Deaths

Dr. Alfred Davis Wetherby, Middletown, aged 35, died December 11 as the result of an automobile accident.

Dr. William N. Bailey, White Plains, aged 76, died December 18 of cerebral hemorrhage.

Dr. Roscoe C. Duncan, Poole, aged 59, died November 19 of heart disease and asthma.

Dr. W. L. Gevedon, Grassy Creek, aged 95, died October 22 of chronic nephritis.

Dr. Daniel Joseph Healy, Lexington, aged 61, died November 24.

Dr. John Cabell Moseley, Henderson, aged 59, died November 15.

Dr. Marion Josephine Alexander, Louisville, aged 38, died November 19 of acute dilatation of the heart.

Dr. J. T. Tichenor, Waterford, aged 64, died November 17 of heart disease.

LOUISIANA

The Avoyelles Parish Medical Society elected the following officers for 1935: President, Dr. S. J. Couvillon, Moreauville; Vice-President, Dr. T. J. Perkins, Simmesport; Secretary-Treasurer, Dr. R. L. Cope, Marksville.

The Caddo Parish Medical Society elected the following officers for 1935: President, Dr. J. M. Gorton; First Vice-President, Dr. J. D. Young; Second Vice-President, Dr. J. P. Sanders; Secretary, Dr. Paul D. Abramson; Treasurer, Dr. D. R. McIntyre.

The Concordia-Catahoula Bi-Parish Medical Society elected the following officers for 1935: President, Dr. H. H. Ratcliffe, Fer-

Continued on page 28

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Continued from page 26

riday; First Vice-President, Dr. E. C. Ferguson, Clayton; Second Vice-President, Dr. C. J. Gordon, Sicily Island; Secretary-Treasurer, Dr. John Schreiber, Vidalia.

The Bi-Parish Medical Society elected the following officers for 1935: President, Dr. N. F. Stafford, Jackson; Vice-President, Dr. A. S. Tombs, Jackson; Secretary-Treasurer, Dr. E. M. Toler, Clinton.

The Lafourche Parish Medical Society elected the following officers for 1935: President, Dr. I. J. Boulet, Larose; Vice-President, Dr. Leo Kerne, Thibodaux; Secretary-Treasurer, Dr. P. J. Dansereau, Thibodaux.

The Orleans Parish Medical Society elected the following officers for 1935: President, Dr. Val H. Fuchs; First Vice-President, Dr. Frederick L. Fenno; Second Vice-President, Dr. James D. Rives; Third Vice-President, Dr. Edwin H. Lawson; Secretary, Dr. H. B. Alsobrook; Treasurer, Dr. Shirley Lyons.

The Red River Parish Medical Society elected the following officers for 1935: President, Dr. L. S. Huckaby, Harmon; Vice-President, Dr. W. B. Hunter, Coushatta; Secretary-Treasurer, Dr. B. Hochfelder, Coushatta.

The St. Tammany Parish Medical Society elected the following officers for 1935: President, Dr. Carl Young, Covington; President-Elect, Dr. H. E. Gautreaux, Covington; Secretary-Treasurer, Dr. H. D. Bulloch, Covington.

The Fourth District Medical Society elected the following officers for 1935: President, Dr. T. B. Tooke, Belcher; Vice-President, Dr. W. J. Norfleet, Shreveport; Secretary-Treasurer, Dr. Paul D. Abramson, Shreveport.

Dr. James M. Mason, Birmingham, Alabama, gave the ninth Stanford E. Chaille Memorial Oration entitled "Standard Emerson Chaille as a Student Viewed Him," at a meeting of the Orleans Parish Medical Society in New Orleans in December.

Dr. James Kirby Howles, New Orleans, and Miss Mildred Ione Dunn were married in November.

DEATHS

Dr. James T. Keator, Bermuda, aged 68, died October 12.

Dr. Barbour Dicks Cooper, Mansfield, aged 67, died October 19 of aneurysm and coronary thrombosis.

Dr. David Erastus Lyons, Lake Charles, aged 68, died September 17.

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Dr. Edward Green Sewell, Bunkie, aged 67, died October 13 of angina pectoris.

MARYLAND

Dr. Henry E. Sigerist, Johns Hopkins University School of Medicine, Baltimore, gave the annual Hodgen Lecture under the auspices of the St. Louis Surgical Society and the Medical Fund Society in St. Louis, Missouri, early in January.

A bronze plaque was recently dedicated to Dr. Frank W. Keating at the Rosewood State Training School, Owings Mills.

Dr. William H. Wilmer, who was officially retired as Director of the Wilmer Institute of Ophthalmology in July, was given a farewell dinner by the Boards of Trustees of Johns Hopkins University and Hospital, Baltimore, November 19.

Dr. George E. Bennett and Dr. Dean Lewis were speakers before the Maryland Academy of Medicine and Surgery November 20 in Baltimore.

Dr. John M. T. Finney, Baltimore, has been appointed a Consultant to the Baltimore City Health Department.

The late Dr. Harry F. Shipley, former Health Officer for the Second District of Baltimore County, has been succeeded by Dr. William E. Martin, Randallstown.

Dr. Frank A. Hoshell, formerly of Baltimore, is Professor of Orthopedic Surgery at the Medical College of the State of South Carolina.

Dr. William K. Skilling is the new Director of the Bureau of Child Hygiene of the Baltimore Health Department.

Dr. Warfield T. Longcope, Professor of Medicine, Johns Hopkins University School of Medicine, has been given the honorary degree of Doctor of Laws by St. John College, Annapolis.

DEATHS

Dr. Herman Albert Voigt, Baltimore, aged 31, died November 12 of bronchopneumonia.

Dr. Patrick H. Casey, Baltimore, aged 58, died in November of cerebral hemorrhage.

Dr. Gordon Moncrieff Dean, Baltimore, aged 34, died December 16 of brain abscess.

Dr. Charles Louis Mattfeldt, Catonsville, aged 67, died October 27.

Dr. John Charles Macgill, Catonsville, aged 64, died November 16 of pneumonia.

Dr. Standish McCleary, Baltimore, aged 64, died October 25 of heart disease.

Dr. John Henry Collenburg, Baltimore, aged 82, died November 13 of arteriosclerosis and cerebral hemorrhage.

Dr. William A. Knell, Baltimore, aged 50, died November 14 of carcinoma.

Dr. A. Leo Franklin, Cumberland, aged 54, died November 19 of heart disease.

MISSISSIPPI

The Central Medical Society, at its recent annual meeting in Jackson, elected the following officers: President, Dr. W. B. Dobson, Jackson; Vice-Presidents, Dr. J. K. Bullock, Jackson, Dr. J. P. Burnham, Canton, Dr. J. B. Ainsworth, Florence, Dr. O. O. Austin, Harpersville, Dr. E. L. Walker, Magee, and Dr. Gilruth Darrington, Yazoo City; Secretary, Dr. L. W. Long, Jackson; Treasurer, Dr. N. F. Kendall, Jackson.

The Issaquena-Sharkey-Warren Counties Medical Society has elected the following officers: President, Dr. F. Michael Smith, Vicksburg; Vice-Presidents, Dr. J. B. Benton, Valley Park, Dr. H. S. Goodman, Cary, Dr. H. H. Johnson, Vicksburg; Secretary-Treasurer, Dr. Leon S. Lippincott, Vicksburg.

The Pontotoc County Medical Society has elected the following officers: President, Dr. E. B. Burns, Ecru; Vice-President, Dr. O. F. Carr, Pontotoc; Secretary-Treasurer, Dr. R. W. Carruth, Tupelo.

The Tri-County Medical Society has elected the following officers: President, Dr. H. R. Fairfax, Brookhaven; Vice-Presidents, Dr. J. H. Beavers, Wesson, Dr. J. R. Marquette, Brookhaven, Dr. A. B. Harvey, Tylertown, and Dr. B. S. Waller, Silver Creek; Secretary-Treasurer, Dr. R. B. Zeller, Hazlehurst.

The physicians of Newton County met at Decatur in November and organized a county medical society. Dr. W. E. Box was elected President and Dr. Stennis, Secretary.

The following Mississippi physicians have received Fellowships for postgraduate study at Tulane University from the Commonwealth Fund: Dr. W. O. Briggs, Osyka; Dr. R. B. Caldwell, Baldwyn; Dr. W. W. Irby, Quitman; Dr. A. D. Majure, Dixon; Dr. J. D. Simmons, Gunnison; Dr. H. G. Waldrop, Dumas; Dr. R. B. Zeller, Hazlehurst; Dr. H. F. Byers, Senatobia; Dr.

Continued on page 30

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Continued from page 28

T. G. Conn, Monticello; Dr. E. J. Guinn, McCondy; Dr. C. M. Gully, DeKalb; Dr. N. W. Nanney, Fulton; Dr. A. K. Naugle, West Point; Dr. Ira B. Seale, Holly Springs; Dr. U. S. Wasson, Moorhead.

A clinic for the x-ray examination of the chests of the border line cases of tuberculosis has been established at the Health Unit in Leflore County by Dr. W. D. Hickerson, Director of the Field Unit on Tuberculosis of the Commonwealth Fund.

Dr. Tom Sparks, Vicksburg, and Miss Gladys Clements were married December 3.

DEATHS

Dr. Henry Otho Lee, Ludlow, aged 55, died October 15.

Dr. Ambrose Chandler Bramlett, Oxford, aged 83, died December 7 of heart disease.

Dr. Walter Scott Sims, Jackson, aged 80, died November 24 of pneumonia.

Dr. Perrin P. Johnson, Bentonia, aged 64, died November 15 of cerebral arteriosclerosis and chronic myocarditis.

MISSOURI

The Buchanan County Medical Society on December 5 elected the following officers: President, Dr. Emmett F. Cook; Vice-President, Dr. J. M. Allaman; Secretary, Dr. O. Earl Whitsell; Treasurer, Dr. John M. Bell.

In appreciation of Dr. Roger William Gay and the hospital which he founded, a bronze memorial plaque was unveiled in the Arcadia Valley Hospital October 4.

The St. Louis Medical Society on November 27 honored twenty-six physicians who have completed fifty years of practice.

The annual Hodgen Lecture under the auspices of the St. Louis Surgical Society and the Medical Fund Society was given by Dr. Henry E. Sigerist, Johns Hopkins University School of Medicine, January 9.

DEATHS

Dr. Julius Ligenfelder, Hermann, aged 70, died suddenly November 4 of heart disease and arteriosclerosis.

Dr. John McDermott, Lockwood, aged 69, died October 23 of nephritis and uremia.

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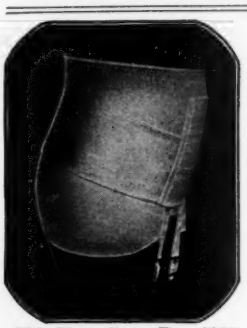

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Dr. Arthur B. Freeman, Rockville, aged 75, died November 11 in Nevada of heart disease.

Dr. Charles Edward Davies, Wishart, aged 81, died October 11 of carcinoma of the stomach.

Dr. James P. Dunigan, Sullivan, aged 75, died December 2 of uremia.

Dr. John Mack Darden, St. Louis, aged 53, died October 13 of angina pectoris.

Dr. Lyman T. Reber, St. Louis, aged 74, died November 15.

Dr. John Calvin Young, Ozark, aged 74, died December 7 of heart disease.

Dr. Oliver R. Edmonds, Tina, aged 70, died November 18 of coronary thrombosis.

Dr. Jacob Geiger, St. Joseph, aged 86, died December 8 of coronary occlusion.

Dr. Otto L. Wolter, St. Louis, aged 59, died January 22 of heart disease.

Dr. Harold H. Greene, Jefferson City, aged 31, died April 8 following a mastoid operation.

Dr. John Ira Tucker, St. Joseph, aged 54, died October 7 of influenza and bronchopneumonia.

Dr. Joseph Patrick Kelly, Kansas City, aged 51, died October 21 of mitral regurgitation.

NORTH CAROLINA

The Buncombe County Medical Society has elected the following officers: President, Dr. L. N. Griffith; Vice-President, Dr. S. L. Whitehead; Secretary-Treasurer, Dr. M. S. Broun.

The Cabarrus County Medical Society has elected the following officers: President, Dr. M. A. Widenhouse; Vice-President, Dr. E. E. Robinson; Secretary-Treasurer, Dr. Rae Morris.

The Edgecombe-Nash Counties Medical Society has elected the following officers: President, Dr. H. Lee Large; First Vice-President, Dr. A. C. Norfleet; Second Vice-President, Dr. J. H. Cutchin; Secretary-Treasurer, Dr. Roy Norton.

The Guilford County Medical Society has elected the following officers: President, Dr. W. P. Knight; Vice-President, Dr. H. H. Ogburn; Secretary, Dr. C. W. Jennings; Treasurer, Dr. A. C. Banner.

The Mecklenburg County Medical Society has elected the following officers: President, Dr. R. L. Gibbon; First Vice-President, Dr. J. A. Elliott; Second Vice-President, Dr. Harvey P. Barrett; Secretary-Treasurer, Dr. G. D. McGregor.

The Pitt County Medical Society has elected the following officers: President, Dr. Jennis Merrill; Vice-President, Dr. Paul Jones; Secretary-Treasurer, Dr. William K. McDowell.

The Wake County Medical Society has elected the following officers: President, Dr. M. R. Gibson; Vice-President, Dr. Frank Yarborough; Secretary-Treasurer, Dr. N. H. McLeod.

Dr. N. Thomas Ennet, formerly of Richmond, but recently connected with the Department of Health of Surry County, has been appointed Health Officer for Pitt County.

Dr. Carl V. Reynolds, Asheville, is Acting State Health Officer, vice Dr. James M. Parrott, deceased.

Dr. William B. Meares, Jr., formerly of Richmond, Virginia, has located in Lexington.

Dr. Jacob C. Leonard, Jr., and Miss Mary Louise Moffitt, both of Lexington, were married October 20.

DEATHS

Dr. George C. Wingate, Charlotte, aged 52, died November 19.

Dr. Charles Greenberry Bryant, Jonesville, aged 69, died October 16 of cardiorenal disease.

Dr. Andrew J. Goodwin, Raleigh, aged 71, died December 15.

Dr. W. P. Wilson, Madison, aged 56, died December 12.

Dr. Jesse Mitchell, Ahoskie, aged 77, died December 8.

OKLAHOMA

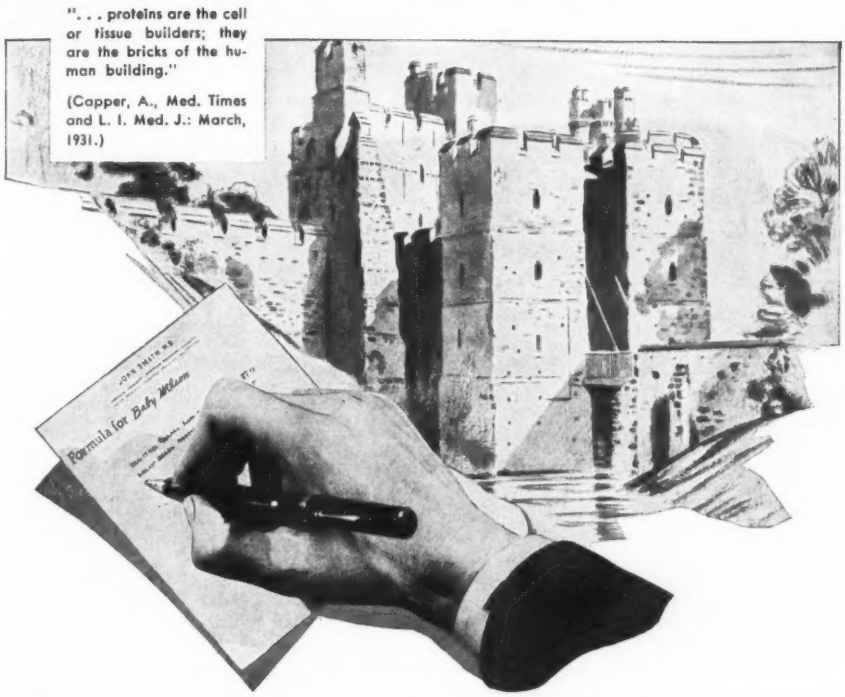
The Okfuskee-Okmulgee County Medical Societies had as speakers at their meeting on November 19 Dr. Hugh G. Jeter and Dr. Lewis J. Moorman, Oklahoma City.

Dr. Alfred I. Folsom, Dallas, Texas, and Dr. Floyd Moorman, Oklahoma City, were speakers at the meeting of the Southern Oklahoma Medical Association early in December.

DEATHS

Dr. Mark W. Harrison, Shadypoint, aged 76, died November 11 of fibroid tuberculosis of the lungs.

Continued on page 32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Continued from page 30

Dr. Lloyd Melville Sackett, Oklahoma City, aged 54, died November 12 of pneumonia.

SOUTH CAROLINA

The South Carolina Medical Association announces that beginning in April there will be a series of courses in obstetrics for physicians of the State with Dr. James R. McCord, Atlanta, Georgia, as instructor.

Dr. Dennis Carnegie Stoudenmire, Honea Path, and Miss Eva Hagan were married November 3.

Dr. William Victor Branford, Dillon, and Miss Lucile Love Bryant were married November 29.

Dr. John A. Wertz, Manning, and Miss Eunice Orr were married November 29.

Dr. Andrew B. Whitaker, Camden, and Miss Alice Irving Ball were married October 24.

Dr. William Hutson Prioleau and Miss Sarah Whitehead Parsons, both of Charleston, were married in November.

Dr. John L. Bundy and Miss Laura Yorke, both of Rock Hill, were married October 19.

TENNESSEE

The Southern Neuropsychiatric Association will hold its annual meeting at the Hotel Peabody, Memphis, February 5 and 6.

Dr. Alfred Parker Smith, Winchester, and Miss Sara Knox McDowell were married September 21.

Dr. Madison H. Buckley, Martin, and Miss Sue Margaret Moore were married recently.

DEATHS

Dr. Emmet L. Ashley, Big Spring, aged 60, died November 18 of injuries received when the automobile in which he was driving overturned.

Dr. Hampton Lansden Fancher, Chattanooga, aged 61, died November 12 of pneumonia.

Dr. Edgar Sharon Turner, LaFollette, aged 50, died November 18 of labora pneumonia.

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BUILD up resistance to winter ailments through the use of **Horlick's Malted Milk.** This nourishing drink is also of great value as a light food during colds and as a means of regaining strength during convalescence.

Easily Assimilated
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HORLICK'S MALTED MILK CORP.
RACINE, WIS.

Dr. Marcus L. Clark, Lynnville, died December 2 of heart disease.

Dr. Paul Hamlin Faucett, Columbia, aged 49, died December 8 of pneumonia.

Dr. James A. Howard, McConnell, aged 72, died October 12.

TEXAS

The Brown-Mills Counties Medical Society, at its annual meeting December 10, elected the following officers for 1935: President, Dr. Ernest F. Cadenhead; Vice-President, Dr. Earle Jones; Secretary-Treasurer, Dr. James B. N. Walker.

The Clay County Medical Society, at its annual meeting on December 12, elected the following officers for 1935: President, Dr. C. K. Arnold; Vice-President, Dr. F. M. Patton; Secretary, Dr. Albert Greer.

The Denton County Medical Society, at its annual meeting on December 13, elected the following officers for 1935: President, Dr. M. C. Sheppard; Vice-President, Dr. Joe Allen; Secretary-Treasurer, Dr. Austin D. Bates.

The El Paso County Medical Society, at its annual meeting on December 10, elected the following officers for 1935: President, Dr. B. F. Stevens; Vice-President, Dr. K. D. Lynch; Secretary-Treasurer, Dr. L. O. Dutton.

The Erath-Hood-Somervell Counties Medical Society, at its annual meeting on December 12, elected the following officers for 1935: President, Dr. J. C. Terrell; Secretary, Dr. T. G. Edwards.

The Falls County Medical Society, at its annual meeting on December 10, elected the following officers for 1935: President, Dr. J. I. Collier; Vice-President, Dr. L. C. Carter; Secretary-Treasurer, Dr. J. Walter Torbett, Jr.

The Grayson County Medical Society, at its annual meeting on December 4, elected the following officers for 1935: President, Dr. A. L. Riddings; Vice-President, Dr. E. L. Hailey; Secretary-Treasurer, Dr. E. F. Etter.

The Hardin-Tyler Counties Medical Society, at its annual meeting on December 11, elected the following officers for 1935: President, Dr. John H. Hunter; Vice-President, Dr. E. D. Pope; Secretary, Dr. Watt Barclay.

The Henderson County Medical Society, at its annual meeting on December 3, elected the following officers for 1935: President, Dr. P. T. Kilman; Vice-President, Dr. L. L. Cockrell; Secretary-Treasurer, Dr. A. H. Easterling.

The Harris County Medical Society, at its annual meeting on December 19, elected the following officers for 1935: President, Dr. J. E. Clarke; Vice-President, Dr. Allen L. McMurrey; Secretary, Dr. M. B. Stokes; Treasurer, Dr. William A. Toland.

The Hutchinson-Carson Counties Medical Society, at its annual meeting on December 3, elected the following officers for 1935: President, Dr. I. C. Morris; Vice-President, Dr. M. M. Stephens; Secretary-Treasurer, Dr. L. C. Hansen.

The Jefferson County Medical Society, at its annual meeting on December 10, elected the following officers for 1935: President, Dr. L. C. Powell; Vice-President, Dr. Ray Orrill; Secretary-Treasurer, Dr. T. L. Pecora.

The Kaufman County Medical Society, at its annual meeting on December 4, elected the following officers for 1935: President, Dr. D. T. Fridell; Vice-President, Dr. J. C. Perry; Secretary-Treasurer, Dr. D. H. Hudgins.

The Kimble-Mason-Menard-McCulloch Counties Medical Society, at its annual meeting, elected the following officers for 1935: President, Dr. G. G. McCollum; Vice-President, Dr. J. T. Guy; Secretary-Treasurer, Dr. G. H. Ricks.

The Lamar County Medical Society, at its annual meeting, elected the following officers for 1935: President, Dr. T. E. Hunt; Vice-President, Dr. E. H. Stark; Secretary-Treasurer, Dr. D. F. Kerbow.

The Smith County Medical Society, at its annual meeting on December 13, elected the following officers for 1935: President, Dr. C. E. Willingham; Vice-President, Dr. L. B. Windham; Secretary-Treasurer, Dr. William M. Bailey.

The Tarrant County Medical Society, at its annual meeting on December 4, elected the following officers for 1935: President-Elect, Dr. S. J. R. Murchison; Vice-President, Dr. J. Haywood Davis; Secretary-Treasurer, Dr. Craig Munter.

The Taylor County Medical Society, at its annual meeting, elected the following officers for 1935: President, Dr. George A. Gray; Vice-President, Dr. B. F. Rhodes; Secretary-Treasurer, Dr. J. N. Burditt.

The Tom Green-Eight County Medical Society, at its annual meeting on December 3, elected the following officers for 1935: President, Dr. Lewis O. Woodward; Vice-President, Dr. W. D. Anderson; Secretary, Dr. W. L. Bush; Treasurer, Dr. J. B. McKnight.

The Wilbarger County Medical Society, at its annual meeting on

Continued on page 34

We quote from page 54 of

"The Milk Question"

by M. J. ROSENAU, Professor of Preventive Medicine and Hygiene, Harvard Medical School.

"Man has but a single stomach and this forms about twenty per cent of the digestive tract. The cow has four stomachs which form about seventy percent of the digestive tract. The calf's stomach is well fitted to handle and digest the tough, lumpy curds which form from cow's milk. Woman's milk curdles into a soft mass which is broken into numberless small particles. Evidently the stomach of the infant fed with cow's milk is over-taxed trying to break the tough curds into particles small enough for complete digestion. It is therefore evident that even if we could secure cow's milk, the chemical composition of which was exactly the same as that of human milk, it would still be far from a perfect substitute unless it behaved similarly in the digestive tract."

SIMILAC is similar to breast milk not only in composition but in digestive properties as well. Like breast milk it forms an extremely fine, soft curd of consistently zero curd tension.

ACCEPTED AMERICAL MEDICAL ASSN. Committee on Foods

Not advertised to the laity and no directions on or in the trade package. Samples for curd tests or trial feedings, literature and recorded results of feeding with SIMILAC will be mailed on receipt of a request on your prescription blank.

SIMILAC *is made from fresh skim milk (casein modified) with added lactose, salts, milk fat, and vegetable and cod liver oils.*

M & R
DIETETIC LABORATORIES, INC.,
COLUMBUS, OHIO.

Continued from page 32

December 10, elected the following officers for 1935: President, Dr. J. C. King; Vice-President, Dr. W. R. Moore; Secretary-Treasurer, Dr. A. L. Borchardt.

The Williamson-Burnet-Llano Counties Medical Society, at its annual meeting on December 11, elected the following officers for 1935: President, Dr. A. J. Rice; Vice-President, Dr. W. C. Wedemeyer; Secretary-Treasurer, Dr. Van C. Tipton.

The Texas Neurological Society held its annual meeting at the Terrell State Hospital November 5.

The Texas Society of Gastroenterologists was organized in San Antonio November 16 by gastroenterologists attending the Southern Medical Association meeting in that city.

At the twenty-first annual meeting of the Medical and Surgical Association of the Southwest, November 22-24, held at El Paso, the following officers for 1935 were elected: President-Elect, Dr. J. J. Gorman; First Vice-President, Dr. C. R. Swackhamer; Second Vice-President, Dr. J. G. Moir; Secretary-Treasurer, Dr. W. Warner Watkins.

The Texas State Board of Health unanimously reappointed Dr. J. W. Brown State Health Officer for a term of two years at the meeting in December.

The Postgraduate Medical Assembly of South Texas, at its annual meeting on October 30, elected the following officers for 1935: President, Dr. E. W. Bertner; First Vice-President, Dr. A. E. Sweatland; Second Vice-President, Dr. J. T. Tadlock; Third Vice-President, Dr. H. Reid Robinson; Secretary, Dr. Herbert T. Hayes; Treasurer, Dr. J. Harolde Turner.

The Texas surgeons elected to fellowship in the American College of Surgeons at the last annual meeting were: Dr. Jesse N. Burditt, Dr. J. Frank Clark, Dr. Ernest R. Middleton, Dr. Edmund M. Cowart, Dr. Herbert Poyner, Dr. Hugh C. Welch, Dr. Sam G. Dunn, Dr. George R. Enloe, Dr. Percy M. Girard, Dr. Gomer Flow Goff; Dr. Frank C. Goodwin, Dr. A. William Multhauf, Dr. John T. Halsell, Dr. Howard E. Lancaster, Dr. Scott E. McNeill, Dr. Richard E. Nicholson, Dr. Joseph H. Shelton, and Dr. Harriss Williams.

Dr. C. L. Martin, Dallas, was elected Chairman of the Executive Council of the American Roentgenologic Society at the annual meeting held in Pittsburg.

Dr. E. L. Goar, Houston, was elected to represent the American Academy of Ophthalmology and Otolaryngology on the American Board of Ophthalmology for a term of four years.

Dr. Sam E. Thompson, Kerrville, was injured when his automobile overturned on the highway near West, Texas, on December 20.

Dr. and Mrs. Fred Horn entertained the members of the Navarro County Medical Society at dinner November 6.

Dr. L. E. Bush has moved from Houston to Huntsville.

Dr. J. C. Gardner has moved from Levelland to Evant.

Dr. Lynn Hilbun has moved from Huntsville to Henderson.

Dr. Henry A. Holle has moved from Brenham to Washington, D. C.

Dr. R. L. Marrett has moved from Hamlin to El Paso.

Dr. L. F. McClenathan has moved from Harlingen to Chicago, Illinois.

Dr. Frank M. Schmidt has moved from Taft to West Los Angeles, California.

Dr. C. J. Carter, Jr., has moved from Oakwood to Fort Worth.

Dr. G. Burton Fain has moved from Forreston to Lone Oak.

Dr. Herbert E. Hipps has moved from Marlin to Houston.

Dr. Lyman Kessler has moved from Denison to Douglas, Arizona.

Dr. L. W. Leggett has moved from San Angelo to Midland.

Dr. W. T. Malone has moved from Beeville to San Antonio.

Dr. John A. Martin has moved from Electra to Big Springs.

Dr. H. J. Swepston has moved from Magnolia to Somerville.

Dr. W. J. Garber, Jr., has moved from Lake Charles, Louisiana, to Navasota.

Dr. R. C. Cross and Mrs. Lillian Neblett, both of Texarkana, were married recently.

Dr. Charles Thomas Brown, San Marcos, and Mrs. Katie Belle Le Wrage were married December 8.

Dr. C. F. Mares, Galveston, and Miss Inez Taber were married September 8.

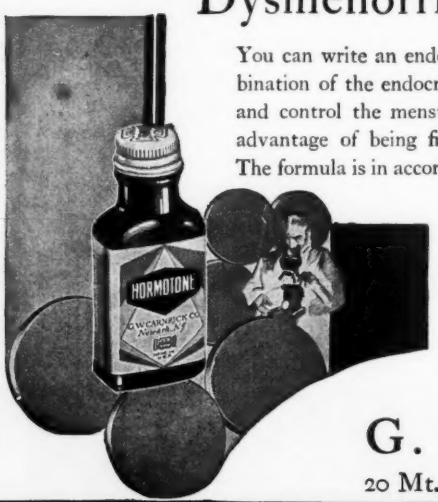
Dr. Edward Thompson and Miss Leonora Kampner, both of Galveston, were married January 20, 1934.

Dr. George Decherd, Jr., Galveston, and Miss Helen Schultze were married June 2.

Dr. E. L. Hunt, of Lubbock, and Miss Frances Sharpless were married recently.

Continued on page 36

An Endocrine Prescription in Dysmenorrhea and Amenorrhea



You can write an endocrine prescription in one word—a proper combination of the endocrine principles which are now known to initiate and control the menstrual process. Your prescription will have the advantage of being filled with fresh potent endocrine constituents. The formula is in accord with the most recent research on the endocrine glands concerned in regulating menstruation.

HORMOTONE

BOTTLES OF 50 AND 100 TABLETS

G. W. Carnrick Co.

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ACCEPTED AMERICAN MEDICAL ASSN.

Milk Modifier

Produced by an infusion of Wheat Flour, Wheat Bran and Malted Barley admixed with Potassium Bicarbonate — consisting essentially of Maltose, Dextrins, Proteins and Mineral Salts.

Directions for using Mellin's Food are left entirely to the physician.

The proportion of maltose and dextrins in Mellin's Food, the protein and mineral salts content and the favorable effect of Mellin's Food on the digestibility of milk are distinctions that commend Mellin's Food as a modifier of milk for the feeding of infants.

Mellin's Food

may be used with expectant satisfaction
in preparing nourishment for infants who must be bottle-fed.

Literature and samples sent to physicians upon request.

Mellin's Food Company - - Boston, Mass.

Continued from page 34

DEATHS

Dr. Edwin W. Stork, Brenham, aged 42, died November 19.

Dr. Andrew Buchanan Small, Dallas, aged 71, died November 29 of coronary occlusion.

Dr. Adam Wood Montague, Fort Worth, aged 41, died November 24 of coronary occlusion.

Dr. Walter Christina Hirzel, Hidalgo, aged 69, died October 6.

Dr. Daniel Grady Arnold, Tyler, aged 42, died in October.

Dr. Oren A. Chitwood, Fort Worth, aged 77, died November 6 of angina pectoris.

Dr. Enoch T. Dunaway, Amarilla, aged 74, died November 26 following an operation for appendicitis.

Dr. William Robert Cate, Commerce, aged 64, died suddenly October 18 of heart disease.

Dr. William Ferris Curran, Waco, aged 61, died November 6 of carcinoma of the stomach.

Dr. Marion L. O'Banion, Houston, died October 28.

Dr. Joseph L. Robertson, Kingsville, aged 48, died October 5.

VIRGINIA

The Richmond Academy of Medicine has elected the following officers for 1935: President, Dr. Frederick P. Fletcher; Vice-Presidents, Dr. Austin I. Dodson and Dr. T. Dewey Davis.

The Seaboard Medical Association of Virginia and North Carolina has elected the following officers for 1935: President, Dr. A. M. Burfoot; Vice-Presidents, Dr. Thomas L. Lee, Dr. Otis T. Amory, Dr. Thomas M. Watson and Dr. John R. Hamilton; Treasurer, Dr. Fred C. Rinker; Secretary, Dr. Clarence Porter Jones.

The Southside Virginia Medical Association has elected the following officers for 1935: President, Dr. S. E. Gunn; Vice-Presidents, Dr. Linwood Farley, Dr. Moses H. Tredway, Dr. Meade Edmunds and Dr. Edward Joyner; Secretary-Treasurer, Dr. R. L. Raiford.

Dr. Hunter H. McGuire, Winchester, has been named by Governor Peery to succeed the late Col. John W. Williams as a member of the Board of Visitors of the Medical College of Virginia.

The Association of Seaboard Airline Railway Surgeons, at its last annual meeting, selected Richmond for the 1935 meeting.

The "MESCO" Laboratories manufacture the largest line of Ointments in the world. Sixty different kinds. We are originators of the Professional Package. Specify "MESCO" when prescribing ointments. Send for lists.

Manhattan Eye Salve Co.

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Classified Advertisements

ALCOHOLISM (30 years' experience)—THE STOKES HOSPITAL, 923 Cherokee Road, Louisville, Kentucky. Telephone, East 1488. Absolute privacy. Treatment one of gradual reduction. Do not limit the quantity of whiskey used in treatment. Each patient treated as an individual case. Craving for alcoholic beverages destroyed; no physical injury incurred. Rates and folder on request.

ASSISTANCE OFFERED TO MEDICAL WRITERS. Research. Abstracts. Translations (all languages). Papers prepared from author's data. Ten years' experience with leading physicians and appointments on medical journals of the highest standing. I employ no assistants; all my work is done personally and is reliable. Florence Annan Carpenter, 413 St. James Place, Chicago, Ill.

Dr. Robert A. G. Jones has been appointed Acting Health Officer for the Albemarle-Charlottesville Joint Health Department until April 1, when the permanent Health Officer will arrive.

Dr. Robert L. Payne, Norfolk, has been elected President of the Southern Surgical Association.

Dr. William D. Tillson has been appointed Assistant Director of Rural Health and Tuberculosis Out-Patient Service of the Virginia State Health Department.

Dr. Karl Blackwell, Richmond, has been elected President of the Parents' League of Richmond.

The School of Biochemistry, Medical College of Virginia, has received from the Josiah Macy, Jr., Foundation, funds for research on cholesterol under the supervision of Dr. Alfred Chanutin.

Dr. A. K. Turner has recently located in Martinsville for the practice of medicine.

Dr. N. P. Fitts has recently located at Mauretown for the practice of medicine.

Dr. William B. Meares, Jr., formerly of Richmond, has moved to Lexington, North Carolina.

Dr. Henry L. Bastien, formerly of Hillsgrove, Pennsylvania, has located at Clarendon for general practice.

Dr. Rolland J. Main will do research work at the University of Chicago on the study of alveolar carbon dioxide in man.

DEATHS

Dr. John Dunn, Richmond, aged 71, died November 7.

Dr. Benjamin May Baker, Norfolk, aged 69, died November 16 of uremia.

Dr. Melvin Oliver Swan, Big Stone Gap, aged 73, died November 19 of diabetes mellitus.

Dr. Charles Everett Carter Peyton, Pulaski, aged 79, died October 30.

Dr. Charles Hopkins Rolston, Mount Clinton, aged 73, died recently of injuries received in an automobile accident.

Dr. Frank Powell Dickinson, Fredericksburg, aged 76, died suddenly October 31 of heart disease.

Dr. J. Bennett Millard, Bristol, aged 48, died November 4 of pneumonia.

Dr. John Hendren Bell, Staunton, aged 51, died December 9 of coronary thrombosis.

Dr. Ernest D. Davis, Standardsville, aged 67, died December 3.

Dr. Heath Ashby Dalton, Hillsville, aged 45, died December 2 of heart disease.

Dr. Robert Tannahill McNair, Emporia, aged 56, died December 9 of pneumonia.

Dr. Dexter P. Cannaday, Roanoke, aged 57, died November 11 of pneumonia.

Dr. Henry Jeter Edmonds, Kilmarnock, aged 68, died December 13 following a stroke of paralysis.

WEST VIRGINIA

The Eastern Panhandle Medical Society, at its annual meeting in December, elected the following officers: President, Dr. E. H. Willard; First Vice-President, Dr. Halvard Wanger; Second Vice-President, Dr. G. O. Martin; Secretary-Treasurer, Dr. Edwin Cameron.

The Fayette County Medical Society, at its annual meeting in December, elected the following officers: President, Dr. George Fordham; First Vice-President, Dr. P. E. Prillaman; Second Vice-President, Dr. W. W. Wilkerson; Secretary-Treasurer, Dr. Ralph Hogshead.

The Grant-Hardy-Hampshire-Mineral County Medical Society, at its annual meeting in November, elected the following officers: President, Dr. P. J. Berry, Jr.; First Vice-President, Dr. J. F. Easton; Second Vice-President, Dr. G. S. Gochenour; Third Vice-President, Dr. V. L. Dyer; Secretary-Treasurer, Dr. Paul R. Wilson.

The Mercer County Medical Society, at its annual meeting on December 13, elected the following officers: President, Dr. P. R. Fox; Vice-President, Dr. E. W. Horton; Secretary, Dr. Charles T. St. Clair, Jr.; Treasurer, Dr. H. G. Steele.

The Marshall County Medical Society, at its annual meeting in December, reelected the following officers for 1935: President, Dr. C. G. Morgan; Vice-President, Dr. R. A. Ashworth; Secretary-Treasurer, Dr. J. A. Streibich.

The Lewis County Medical Society, at its annual meeting in December, elected the following officers: President, Dr. Samuel H. Burton; Vice-President, Dr. W. P. King; Secretary-Treasurer, Dr. Theresa O. Snaith.

The Monongalia County Medical Society, at its annual meeting, elected the following officers: President, Dr. B. C. John; Vice-President, Dr. S. F. Talbott; Secretary, Dr. G. R. Maxwell; Treasurer, Dr. L. W. Cobun.

WHEN HIGH CALORIC INTAKE IS NEEDED *you can depend on* KLIM

In diets for the treatment of

ANOREXIA • VOMITING • TYPHOID FEVER • NEPHRITIS

—or whenever concentrated feeding is necessary, KLIM, the powdered whole milk, mixed with regular foods, will supply added caloric and nutritive values *in small bulk.*

Two ounces of KLIM provide the caloric value of a *pint* of milk. KLIM contains the natural elements . . . minerals, proteins, butterfats and vitamins . . . of milk: *everything but the water.*

The KLIM cookbook (Reinforced Diet Recipes), gives you a simple means of readily prescribing these elements in concentrated diets in cereal, beverage, soup, etc. Taste, bulk and appearance of foods are not changed. We will gladly forward as many copies of the booklet as you desire for patient distribution, together with samples of KLIM.

A Typical Recipe from "Reinforced Diet Recipes"

CREAM OF TOMATO SOUP

1 cup thin tomato soup or
1 cup diluted canned tomato soup
6 tablespoons KLIM
¼ teaspoon salt

Blend tomato soup, 6 tablespoons KLIM and ¼ teaspoon salt. Bring to scalding point and serve. Volume: 1 cup.

This recipe furnishes ½ cup of milk (84 calories) over normal recipe.

KLIM

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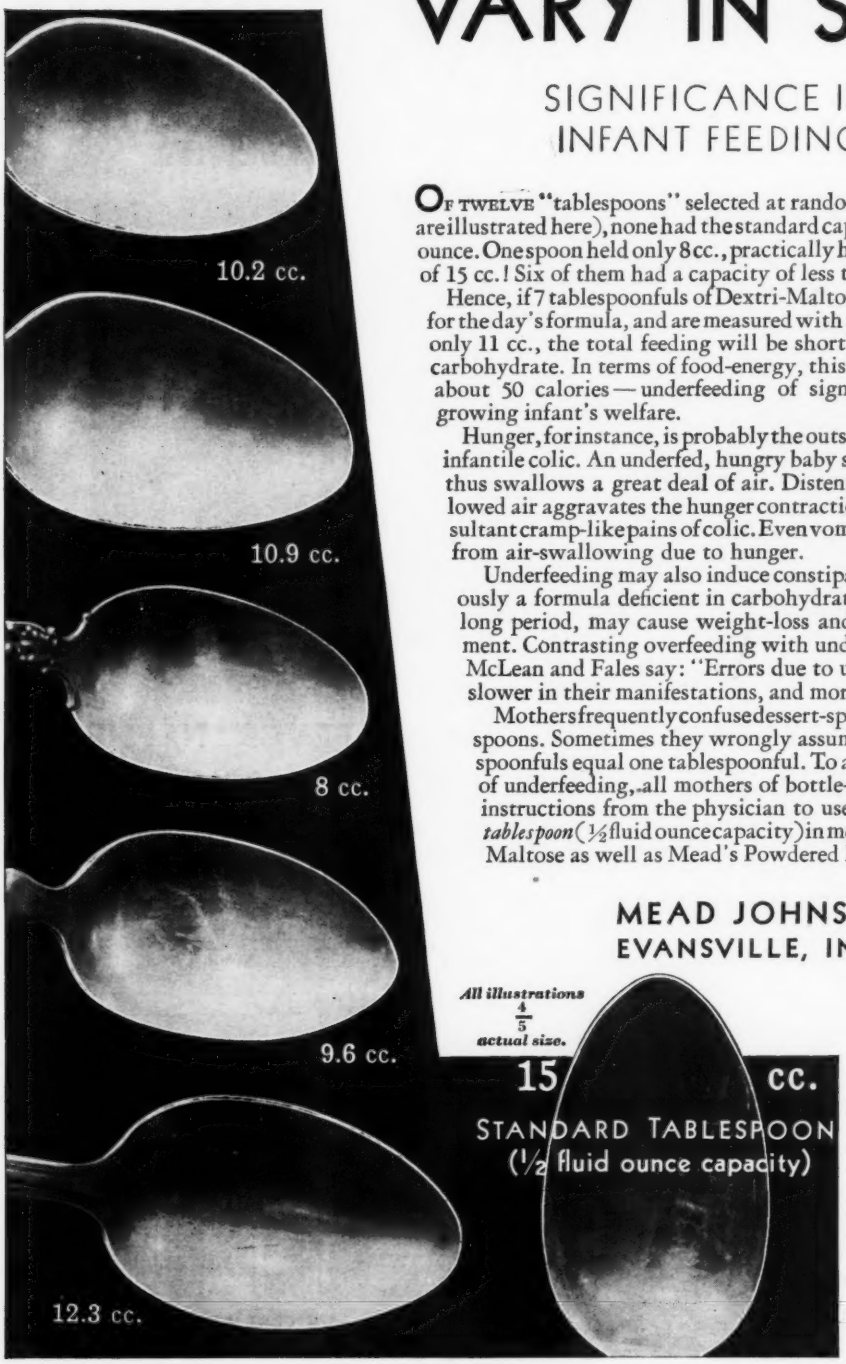
THE BORDEN COMPANY, Dept. 239, 350 MADISON AVENUE, NEW YORK, N. Y.

TABLESPOONS VARY IN SIZE

SIGNIFICANCE IN INFANT FEEDING



OF TWELVE "tablespoons" selected at random (six of which are illustrated here), none had the standard capacity of ½ fluid ounce. One spoon held only 8 cc., practically half the standard of 15 cc.! Six of them had a capacity of less than 11 cc.

Hence, if 7 tablespoonfuls of Dextri-Maltose are prescribed for the day's formula, and are measured with a spoon holding only 11 cc., the total feeding will be short almost 25% of carbohydrate. In terms of food-energy, this is a shortage of about 50 calories — underfeeding of significance to the growing infant's welfare.

Hunger, for instance, is probably the outstanding cause of infantile colic. An underfed, hungry baby sucks its fist and thus swallows a great deal of air. Distention from swallowed air aggravates the hunger contractions, with the resultant cramp-like pains of colic. Even vomiting may ensue from air-swallowing due to hunger.

Underfeeding may also induce constipation, and obviously a formula deficient in carbohydrate, given over a long period, may cause weight-loss and slow development. Contrasting overfeeding with undernourishment, McLean and Fales say: "Errors due to underfeeding are slower in their manifestations, and more insidious."

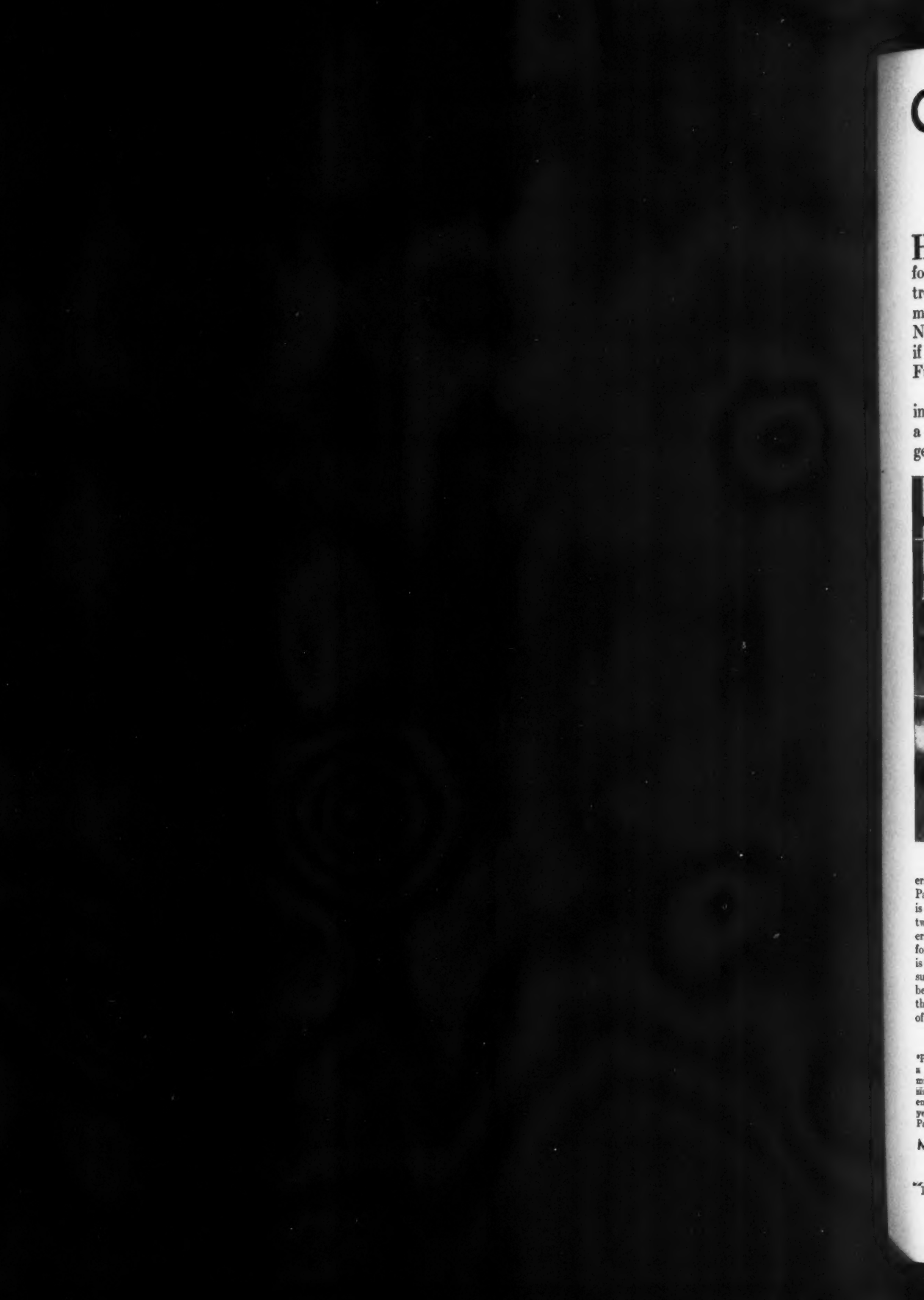
Mothers frequently confuse dessert-spoons with tablespoons. Sometimes they wrongly assume that two teaspoonfuls equal one tablespoonful. To avoid these evils of underfeeding, all mothers of bottle-fed babies need instructions from the physician to use *only a standard tablespoon* (½ fluid ounce capacity) in measuring Dextri-Maltose as well as Mead's Powdered Milks.

MEAD JOHNSON & CO.
EVANSVILLE, IND., U.S.A.

MEAD'S SERVICE — "WE ARE KEEPING THE FAITH"

Mead Products Are Advertised Only to Physicians.

Please enclose professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons



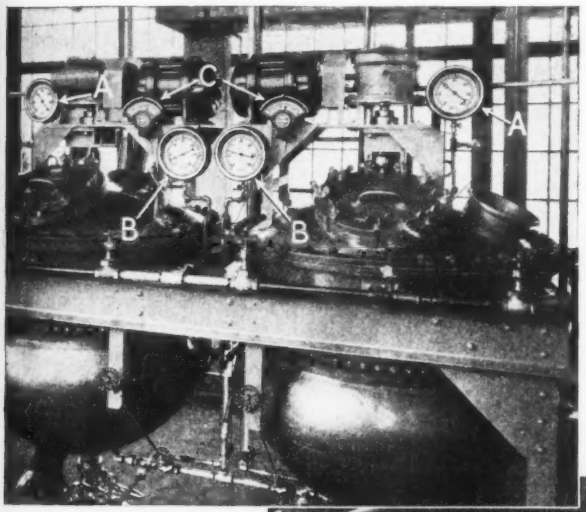
CONTROLLED Cereal Cookery

If you instruct ten different mothers, "Cook baby's cereal thus and so," there will be ten different results.

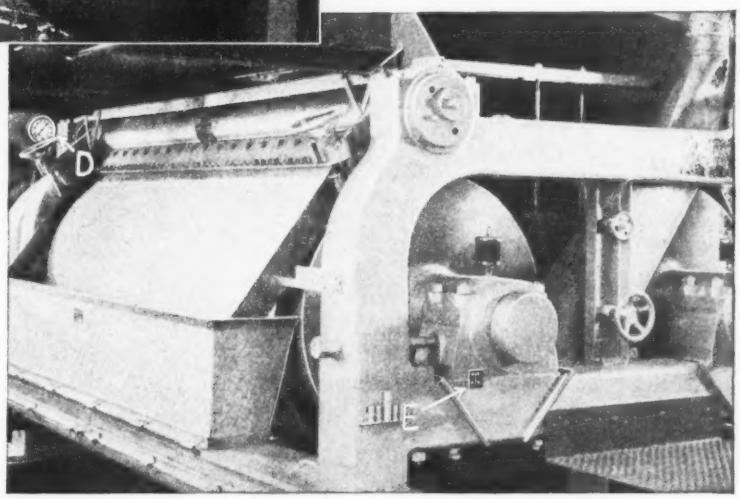
HOME-COOKED cereal is seldom a uniform product . . . because of many uncontrolled factors. The cook, for instance, rarely measures the cereal and the liquid accurately. Nor does she time the cooking carefully. Even if she does, the intensity of the heat varies. Further, the degree of evaporation differs.

Even the type of utensil is a factor. Cooking cereal in a double boiler is likely to cause a surface "skin" to form that is even less digestible than raw starch, Carman *et al* find from digestibility studies *in vitro* of breakfast cereals. They also report that single-boiler cooking for more than 15 minutes actually "decreases digestibility because of the formation of lumps produced by too rapid evaporation of water." This clumping is unavoidable without a condenser and with ordinary household utensils.

Pablum*, in contrast, is manufactured by a patented process and precision methods which insure a thoroughly cooked and uniform cereal. This is substantiated by *in vitro* studies of Ross and Burrill, which show that the starch of Pablum without additional cooking is more rapidly digested than that of oatmeal, farina, cornmeal, or whole wheat cooked 4 hours in a double boiler.



Left—Two double-jacket cookers in which Pablum is steam-cooked under rigid control. Live steam of uniform pressure and temperature flows into the cookers and displaces air above the cereal thus preventing oxidation and affording protection to vitamins and flavor. A unique paddle-knife constantly agitates the mixture so that a fresh surface is constantly presented to the steam. Note three gauges used in controlling cooking: (A) gauges maintaining uniform steam pressure in tops of cookers; (B) gauges regulating steam pressure in surrounding jackets; (C) thermometers for control of temperature (control of steam pressure and of temperature are both essential).



Right—One of many drum dryers used in the manufacture of Pablum. After the cereal mixture is steam-cooked it is dropped between revolving steam-heated rollers which roll and dry it in a uniform layer of material. Gauge (D) is used as a check on the steam pressure within the drums. Distance between them is maintained within thousandths of an inch by means of a micrometer plate (E).

*Pablum (Mead's Cereal pre-cooked) is a palatable cereal enriched with vitamin and mineral containing foods, consisting of wheatmeal, oatmeal, wheat embryo, alfalfa leaf, beef bone, brewers' yeast, iron, salt, and sodium chloride. Patent pending.

MEAD JOHNSON & CO.
Evansville, Ind., U.S.A.

"Please send professional card when requesting samples of Mead Johnson products to cooperate in preventing their reaching unauthorized persons

One of a series of advertisements prepared and published by PARKE, DAVIS & CO. in behalf of the medical profession. This "See Your Doctor" campaign is running in the *Saturday Evening Post* and other leading magazines.

Dear Dr. Armstrong:

Nothing would do but that Bobby bring this to you himself, in person.

It's partly because you and he became such good pals when you pulled him through that siege last summer.

But more than that, he had heard his Dad and me talking, and he knew that this was different from the ordinary check we send out—that it deserved something more than the slapping on of a stamp and routine delivery by the mail man.

And Bobby is right.

You couldn't have done more if he had been your own child. We've always known this, and yet your bill has lain here, put off month after month, while bills for other things have been paid.

It wasn't that we didn't want to pay you, for we did. But after we bought those things necessary to keep us going—food, and clothing, and coal—our bank balance was pitiful to behold.

Now, thank heavens, things are a little brighter. And here at last is our chance to send you something more than thanks for all you did for Bobby and for us.

Sincerely,

Mrs. J____ B____

PARKE, DAVIS & COMPANY
DETROIT, MICHIGAN
The World's Largest Makers of Pharmaceutical and Biological Products